(1 mark)

(2mark

(1 mark)

(1 mark)

(2 marks)

(1 mark)

MAKUENI COUNTY CLUSTER PREPARATORY EXAMINATION 2016

231/1

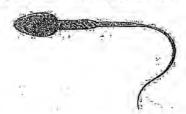
BIOLOGY

Paper 1

(Theory)

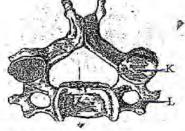
July / August 2016 Time: 2 Hours

The following diagram shows a specialized cell.



- a) Identify the specialized cell.
- State the function of the cell named in (a) above.
- The diagram below represents a mammalian bone.



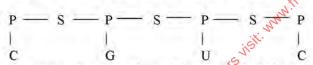


State the function of the part labeled K and L

State the region of the body in which the above bone is found b)

3. What is a test cross? a)

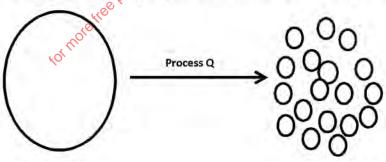
The figure below is a structural diagram of a portion from a nucleic acid strand.



Giving a reason, name the nucleic acid which the portion belongs.

Write down the sequence of bases of the complimentary strand to that shown above.

The diagram below illustrates a physiological process that occurs in the alimentary canal of man.

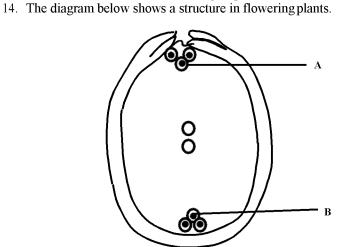


A fat molecule

Fat droplets

	Fig. 2 Decree Andrews	
	a) Name the process Q above	(1 mark)
	 Explain the biological importance of the above process. 	(1 mark)
	 Name the substance that helps the process named (a) above. 	(1 mark)
5.	State the function of the following parts of the human ear.	
	a) Tympanic membrane	(1 mark)
	b) Round window	(1mark)
6.	What is the role of water in photosynthesis?	(1 mark)
7.	Name the function of the following organelles found in a cell.	(2 mark)
	a) Centrioles	
	b) Nucleolus	
8.	State the fluids that provide cushion in the following organs	(4 marks)

				Biology p1, p2&p3
	(a)	Lungs		
	(b)	Heart		
	(c)	Knee		
	(d)	Eye ball		
9.	The	e wings of a bird a	nd those of a housefly adapt the two organisms to a boreal habitat.	
	i)	Give the evolution	onary process that may have given rise to these structures.	(1 mark)
	ii)	What name is giv	ven to such structures?	(1 mark)
10.	Na	me the branch of b	iology that deals with the study of insects.	(1 mark)
11.	Wh	at are the function	s of amniotic fluid?	(2 marks)
12.	a)	What is a species	?	(1 marks)
	b)	State three princ	iples that govern binomial nomenclature.	(3marks)
13.	a)	Why are people v	with blood group AB referred to as universal recipients?	(1 mark)
	b)	Name the antiboo	dies in blood group O	(1 mark)

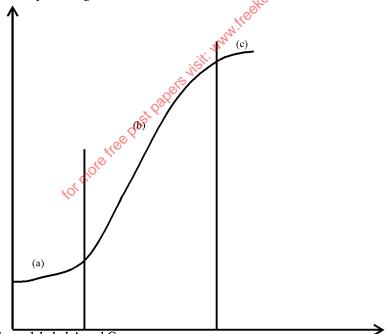


State the function of each of the following parts labeled A and B after double fertilization.

15. Explain the role of insulin in blood glucose regulation.

(2 marks) (2 marks)

16. The graph below represents growth of bacteria when cultured in a suitable media.



a) Name phases labeled A and C.	(2 marks)
b) Account for the growth of the organism in phase (a)	(2marks)
17. a) Name two mechanisms involved in absorption of mineral salts.	(2 marks)
b) Name two differences between a monocotyledonous stem and a dicotyledonous stem	(2marks)
18. State four adaptations of respiratory surfaces.	(4 marks)
19. a) What is synecology	(1 mark)
b) Name two abiotic factors in water that affect living organisms.	(2marks)
20. Name three methods by which plants eliminate their waste.	(3 marks)
21. State three similarities between Aves and Pisces	(3 marks)
22. State three roles of osmosis in plants	(3marks)

23. The oxidation of a certain fat is represented by chemical equation shown below.

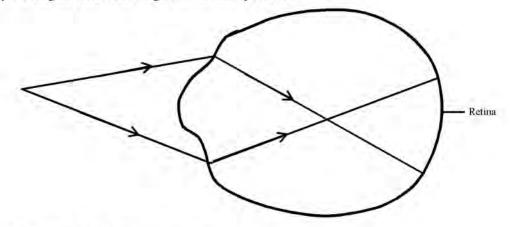
 $C_{57}H_{104}O_6 + 80 O_2 \rightarrow 57CO_2 + 52H_2O + Energy$

a) Calculate the respiratory quotient (RQ) of the fat

(2marks) (2marks)

b) What is the significance of RQ?

24. Study the diagram below showing a mammalian eye defect.



- i) Identify the eye defect
- ii) How can the above defect be corrected
- 25. Name two kingdoms whose members reproduce by means of spores.
- 26. a) Why are tracheids less efficient in transporting water and mineral salts.
 - b) State any two adaptations of the phloem to its function.
- 27. Complete the table below

(1 mark)

(1 mark)

(2 marks)

(1marks) (2 marks)

(3 marks)

Disease

Causative agent

Amoebic dysentry

Schistosoma Mansoni

Syphilis

b)

28. The figure below shows blood of a person that was obtained after a test.



- a) What condition is the person suffering from?
 - Why would such a person survive better in malaria prone areas than a normal person?
- c) What is the disadvantage of acquiring such a condition?

29. State two reasons why blood flow under high pressure in arteries than veins.

(1mark)

(2marks)

(1mark)

(2 marks)

The diagram below indicates an organism that grows under shaded places with damp conditions. Study it and answer the questions that follow.



Name the division to which the specimen belongs.

(1 mark)

b) Name the parts labeled Q, R and S.

(3 marks)

(2 marks)

(2 marks)

Name the two body forms of the organism in its alteration of generations. diagram below shows a template strand of December 1. The diagram below shows a template strand of Deoxyribonuclenic acid molecule.



i) Complete the diagram by drawing the missing complimentary strand.

(1mark)

ii) Name two chemical components that make the backbone of deoxyribonuclenic acic molecule.

(2marks)

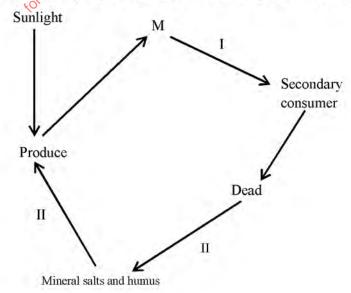
A woman who is a carrier for haemophilia got married to normal man. Work out the genotypes of the offsprings. Take the gene for haemophilia to be "h"

(4marks)

Name one disorder in humans due to chromosomal mutations.

(1 marks)

5. The diagram below represents recycling of nutrients in a certain ecosystem. Study it and answer the questions that follow.



		Biology p1, p2&p3
a)	Name the tropic level represented by M.	(1mark)
b)	Name the process represented by I, II, and III.	(3 marks)
c)	Name the organism involved in process II.	(1mark)
d)	What would happen within the ecosystem if all secondary consumers were eliminated?	(3 marks)

SECTION B: (40 MARKS)

Answer questions 6 (compulsory) and either question 7 or 8 in the spaces provided

In an investigation two people M and N drunk some amount of strong glucose solution. Their blood sugar levels were immediately determined and thereafter at one hour intervals for the next six hours. The results were shown in the table below.

Time (hours)		0	1	2	3	4	5	6
Glucose level in mg/100ml of	Person M	90	220	160	110	100	100	90
blood.	Person N	110	340	320	300	260	245	215

a) b) c)	In the grid provided, plot a graph for the blood glucose level against time for person M and N. In man the normal blood sugar level is about 90ml/100ml of blood. Explain the change in the sugar level in person in the first 4 hours. The 6 th hour. Suggest a possible reason for the high blood sugar in person N. How can the high blood sugar in person Nbe controlled.	(8 marks) on M during. (2marks) (2marks) (1mark) (1 mark)
d)	The pancreas and the liver work together in the regulation of glucose in the blood.	(=)
	i) State the role of these organs when the concentration of glucose in blood is below normal.	(2 marks)
	ii) What would be the effect of removing the pancreas from the body?iii) Distinguish between diabetes mellitus and diabetes insipidus.	(1 mark) (2marks)
7.	Describe the uptake and movement of water from the soil to the leaves of a tall plant till transpiration.	(20 marks)
8.	a) Describe the manager of accommodation in the homeon are	(10 marks)
	b) Describe the mechanism of regulation of the amount of light entering the eye.	(10 marks)
	b) Describe the mechanism of regulation of the amount of light entering there've.	

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MAKUENI COUNTY CLUSTER PREPARATORY EXAMINATION 2016

Kenya Certificate of Secondary Education (K.C.S.E)

231/3 **BIOLOGY** PAPER 3 (PRACTICAL) 1³/₄ HOURS

CONFIDENTIAL

REQUIREMENTS

Each candidate should have the following:-

- One large table spoonful of millet soaked for not more than one hour labeled M.
- NaHCO₃ solution.
- Measuring cylinder
- Two clean droppers
- Means of labeling
- Thermometer
- Means of timing
- 0.1M HCL labeled L
- Four clean test tubes
- Pestle and mortar
- **Iodine solution**
- Benedicts solution
- 250ml glass beaker
- A tripod stand
- Wire gauze
- Source of heat
- A white tile
- Solution of amylase /diastase enzyme labeled K
- Source of clean water.

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MAKUENI COUNTY CLUSTER PREPARATORY EXAMINATION 2016

231/3

BIOLOGY

PAPER 3

(PRACTICAL)

JULY/AUGUST 2016

13/4 HOURS

1. You are provided with specimen labeled M - soaked millet.

Grind them using pestle and mortar, adding more water to get fine solution.

Labelle four clean test tubes: A, B, C and D.

Put about 4ml of the solution into each of the four test tubes.

a) To solution in test tube A, add some few drops of iodine. Shake the solution to mix well. Pour some little solution onto a white tile.

Note down the observation.

(1mark)

ii) Account for your observation in (a) (i) above.

(1mark)

Into solution in test tube B, add about 2ml of benedict"s solution. Place it in a boiling water bath.

i) After about three minutes, record your observation.

(1mark)

ii) What is your conclusion from the observation in (b) (i) above?

(1mark)

) For the remaining test tubes:-

To test tube C, add about 3ml of solution labeled K.

- To test tube D, add 3ml of solution K and about 2ml of solution L

Place both mixtures C and D in a water bath. Maintain the water bath at 37°C

Allow it to stand in the water bath for 30 minutes.

After 30 minutes, remove the test tubes. Add about 2ml of benedict"s solution to each test tube and shake well. Place the two test tubes in a boiling water bath. After 5 minutes record your observation in the table below.

(4marks)

Test tube	observations	Deductions	
С	asti.		
D	-se ^k		

d) Account for your observation in test tubes C and D

(4 marks)

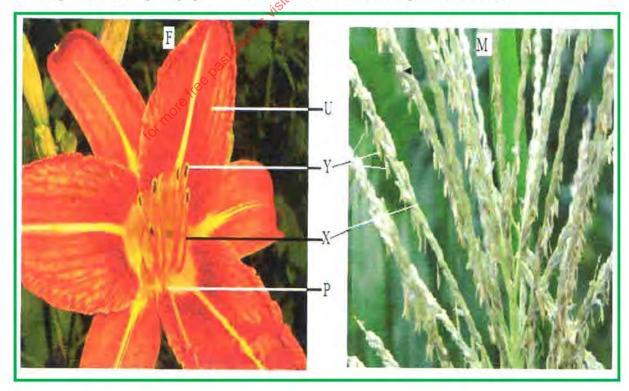
e) i) Why was the set up placed at 37°C?

(1 mark)

i) Suggest identity of solution L and K.

(2marks)

2. You are provided with a photograph of F and M. Use them to answer the questions that follow



a) What type of flower is

i) F

(1 mark)

Biology	p1,	p2&p3
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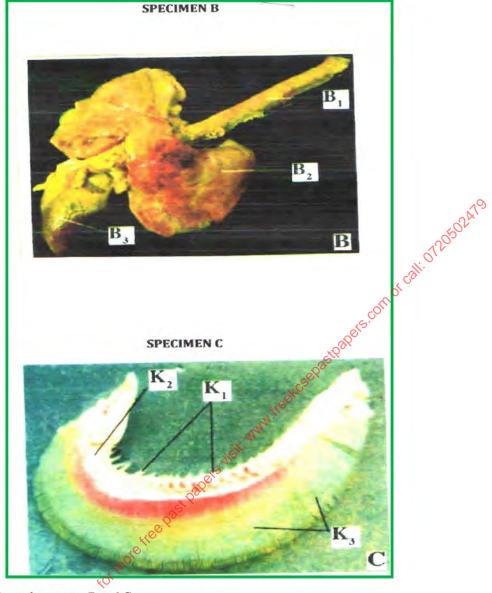
ii) M (1mark)

b) Name the agents of pollination for each. (2marks)

c) State how each of them is adapted for the mode of pollination you have stated in (b) above. (4 marks)

d) Name parts labeled P,U,X and Y (4 marks

3. Below are photographs labeled B and C of organs obtained from different animals. The organs perform similar functions. Examine them and answer the questions that follow.



a) Name the organs B and C. (2marks)

b) State the common functions performed by the organs stated above. (1 mark)

c) Name the parts labeled B_1 , B_2 and B_3 in the photograph B. (3marks)

d) i) Identify the parts labeled K₁,K₂,and K₃ in photography C (3 marks)

ii) Using observable features; state how the parts labeled K₁ and K₃ you identified in d (i) above are adapted to their function. (4 marks)

CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2016

231/1

BIOLOGY

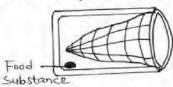
PAPER 1

(THEORY)

JULY/AUGUST, 2016

TIME: 2 HOURS

Study the diagram below and answer the questions that follow:



(a)	Identify the above apparatus.	(1mk)
(b)	State the function of the above apparatus.	(2mks
(c)	Name an apparatus that can be used for catching insects on barks of trees or rock surfaces.	(lmk
(d)	Name the branch of Biology that deals with the study of birds.	(1mk)

The table below shows organisms in a given habitat.

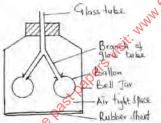
Organism	Number
Small fish	75
Algae	1942
Mosquito larvae	1200
King fisher	10
Water weed	1695
Water snail	75

(a) Calculate the total number of producers. (1mk) (b) Name the organisms that could be both primary and secondary consumers. (1mk)

(c) Name the process through which energy from the sun is incorporated in the ecosystem. (lmk)

(d) State why decomposers are not included in the food chain. (1mk) What is nitrogen fixation? (1mk)

3. Study the diagram and use it to answer the questions that follow.



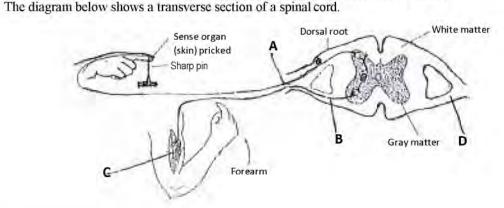
Mention the equivalent of the following in the mammalian breathing system.

(a)	Bell far	(lmk)
(b)	Balloon.	(lmk)
(c)	Rubber sheet	(1mk)

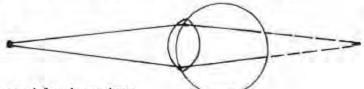
Name the structure for gaseous exchange in

(a) Tadpole (1mk) (1mk)

(b) Grasshopper.....



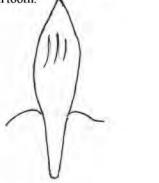
The diagram below shows the point of focus of light from an object.



Name the eye defect shown above.

(1mk)

Below is a diagram of a human tooth.



(a) Identify the type of the tooth.

(lmk)

(b) State the function of the above tooth.

(lmk)

(a) State two modes of heterotrophic nutrition by which organisms obtain their food.

(2mks)

(b) Explain why emulsification is not a chemical digestion.

(lmk)

A process that occurs in some organisms is represented by the equation below.

 $C_6H_{12}O_6 \rightarrow 2C_2H_5 \text{ oH} + 2O_2 + \text{Energy}$

(a) Name the process.

(1mk)

(b) State the name of the compound K.

(lmk)

(c) State the economic importance of the above reaction in Kenyan industries.

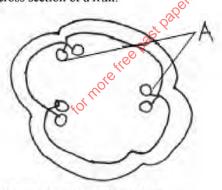
(2mks)

11. State the significance of respiratory quotient (RQ).

(1mk)

12. What is the importance of laying eggs in long strands of slipperly jelly-like substance in animals that exhibit external fertilisation. (3mks)

13. Below is across section of a fruit.



(a) Name the type of placentation shown.

(1mk)

(b) Identify the parts labelled A.

(lmk)

14. Explain why athletes practicing at high altitude zones have a higher number red blood cells than those at sea level.

(2mks)

15. Name the blood vessel that transports blood;

(a) From small intestines to the liver.

(1mk)

(b) To the ileum.

(1mk)

16. Name the tissue in plants that is responsible for transport of carbohydrates.

(1mk)

Give one structural difference and similarity between a mitochondrion and a chloroplast.

(2mks)

18. What is the function of the following parts in a microscope?

(2mks)

(a) Condenser.

(b) Diaphragm.

19. What is the importance of fixation in preparation of temporary slide?

(lmk)

		Biology p1, p2&p3
20.	What is the significance of seed dormancy?	(3mks)
	State two advantages of metamorphosis to the life of an insects.	(2mks)
	Potato cylinders were weighed and kept in distilled water overnight. They were then reweighed.	,
	At the beginning At the end	
	2.5g 2.4g 2.7g 3.0g 3.1g 3.2g	
(a)	Calculate the average mass of the potato cylinders at the end of the experiments.	
	(Show your working).	(2mks)
(b)	Explain why the mass of the cylinders had increased.	(3mks
23.	Explain why the garden pea plant was preferred by Gregor Mendel in his crossing experiments.	(3mks)
24.	Give two structural differences between DNA and RNA molecules.	(2mks)
25.	Name two substances that are excreted through diffusion process in plants.	(2mks)
26.	(a) Arrange the following nitrogenous waste products in order of decreasing toxicity:	
	urea, uric acid and ammonia.	(1mk)
	(b) Explain why desert animals excrete their nitrogenous wastes in form of uric acid.	(1mk)
27.	Name one waste product that is transported in the blood but not removed by the kidneys.	(1mk)
28.	A student collected a plant with the following features:	
-	Vascular bundles in the stem were scattered with no cambium.	
-	Fibrous root system.	
	Name the sub-division and the class to which the above plant belonged.	(2mks)
	Sub-division 6	
	Class	
29.	Write the kingdoms to which the following organisms belong.	(3mks)
	Plasmodium	
	Bat	
	Yeast	
30.	The wings of a bird and that of insects are analogous structures.	
	(a) What are analogous structures?	(2mks)
	(b) Name this type of evolution.	(1mk)
31.	Name a vestigial structure found in:	
	(a) Man.	(1mk
	(b) Whale.	(1mk)
32.	(a) Name the hard body covering found in organisms of the phylum arthropoda.	(1mk)
	(b) Give two uses of the structure mentioned in (a) above.	(2mks)
	turea, turic acid and ammonia. (b) Explain why desert animals excrete their nitrogenous wastes in form of uric acid. Name one waste product that is transported in the blood but not removed by the kidneys. A student collected a plant with the following features: Vascular bundles in the stem were scattered with no cambium. Fibrous root system. Name the sub-division and the class to which the above plant belonged. Sub-division Class Write the kingdoms to which the following organisms belong. Plasmodium Bat Yeast The wings of a bird and that of insects are analogous structures. (a) What are analogous structures? (b) Name this type of evolution. Name a vestigial structure found in: (a) Man. (b) Whale. (a) Name the hard body covering found in organisms of thephylum arthropoda. (b) Give two uses of the structure mentioned in (a) above.	
	ر _{اه} و) .	

(1mk)

(1mk)

(lmk)

(1mk)

(2mks)

(1mk)

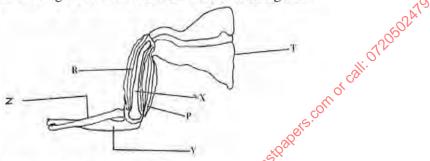
CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2016

231/2 BIOLOGY PAPER 2 (THEORY) JULY/AUGUST, 2016 TIME: 2 HOURS

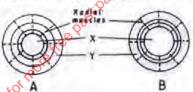
SECTION A: (40 MARKS)

Answer all the questions in this section in the spaces provided:

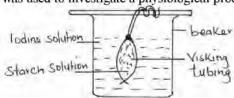
- In a certain plant species which is normally green, a recessive gene for colour (n) causes the plant to be white when present in homozygous state such plants die at an early stage; The plants are pale green in colour when in heterozygous state and grow to maturity.
- (a) Give a reason for the early death of plants with homozygous recessive gene. (1mk)
- (b) If a normal green plant was crossed with the pale green plant, what would be the genotypes of the F₁ generation (use punnet square to work out the answer) (3mks)
- (c) If seeds from the heterozygous plants were planted and the resulting seeds planted, work out the phenotypic ratio of plants that would grow to maturity. (3mks
- (d) Explain the occurrence of the pale green colour in the heterozygous plants. (1mk)
- Below is a diagram showing the forearm bones and muscles covering them?



- Name the bones represented by T, X, Y and Z. (2mks)
- Name the joint formed between: (b)
- T and X. (i)
- Y and X. (ii)
- Name the muscles labelled P and R. (c)
- (d) What happens to each muscle as the arm is straightened.
- Name two strengthening tissues in woody stems. (e)
- 3.
- The diagram below shows how the iris and pupil of a human eye appear under different conditions.



- (a) Name the structures labelled X and Y. (2mks)
- State the condition that leads to the change in appearance shown in the diagram labelled B. (lmk)
- Describe changes that lead to the appearance of iris and pupil as shown in the diagram labelled **B**. (4mks)
- What is the significance of the changes described in C above?
- The following set up was used to investigate a physiological process inlife.



- (a) (i) Name the physiological process that was being investigated. (lmk)
 - (ii) What is the representative of the visking tubing in life? (1mk)
- (i) State the observation that would be made in the visking tubing after few minutes. (1mk)
- (ii) Explain why similar results were not obtained inside the beaker. (2mks)
- State the roles of the process being investigated in mammals. (3mks)
- 5. The table below compares the approximate concentration of certain substances in plasma glomerula filtrate and urine.

Substance	% in plasma	Glomerular filtrate	% urine
Water	90	90	94
Protein	6.5	0	0
Urea	0.03	0.03	1.8
Glucose	0.1	0.1	0

(a) Account for the absence of

(i) Glucose in urine.
 (1mk)
 (ii) Protein in glomerular filtrate.
 (1mk)

(b) Why is percentage of urea highest in urine? Give **two** reasons. (2mks)

(c) How would the composition of urine differ from the one given above in case of:

(i) High protein diet. (2mks)

(ii) Streneous exercise. (2mks)

SECTION B: (40 MARKS)

Answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. In an experiment to investigate the effect of heat on germination of seeds, eleven bags each containing 50 bean seeds were placed in a water-bath maintained at 90°C. After 2 minutes, a bag was removed and the seeds contained in itplanted. The number that germinated was recorded. The procedure used for the beans was repeated for acacia seeds. The results obtained were as shown in the table below.

Times (minutes)	Number of seeds that germinated		
	Beans seeds	Acacia seeds	
0	50	0	
2	50	0.12	
4	46	".i _O ,	
6	35	2	
8	10	28	
10	1	36	
12	0	41	
14	0	28 36 41 44 47 48	
16	0	47	
18	0	48	
20	ري 0	50	

- (a) Using a suitable scale and on the same axes, draw graph of time in hot water against number of seeds that germinated for each plant. (8mks)
- (b) (i) After how many minutes would you expect 50% of acacia seeds exposed to the hot water to germinate. (1mk)
 - (ii) What was the minimum number of minutes after exposure of bean seeds to hot water was there no germination?

(1mk)

- (c) From the graphs, which one of the two types of seeds was more sensitive to heat influence on germination? (1mk)
 Give a reason for your answer. (1mk)
- (d) Explain why the ability for the,
 - (i) bean seeds to germinate decline with time of exposure to heat. (2mks)
 - (ii) acacia seeds to germinate improved with time of exposure to heat. (3mks)
- (e) What results would be expected if the temperature of water was maintained at:-
- (i) 100°C. (2mks)
- (ii) 5°C. (2mks)
- (10mks). (a) Describe the photosynthetic theory of opening and closing of the stomata.
 - (b) Describe the regulation of blood sugar level in man. (10mks)
- 8. Describe the nitrogen cycle. (20mks)

231/3 **BIOLOGY PAPER 3 (PRACTICAL)**

CONFIDENTIAL

CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2016

Requirements:

- 1. Glucose 5% Solution X 10mls per student
- 2. Starch powder 5%
- 3. Iodine solution.
- 4. Benedicts solution.
- 5. Biurets reagent.
- Test tubes (3) 6.
- 7. Means of heating.
- 8. Test tube holders.
- 9. Maize seedling with at least 2 leaves and should have the remnants of the maize grain.

<u>NB</u>:

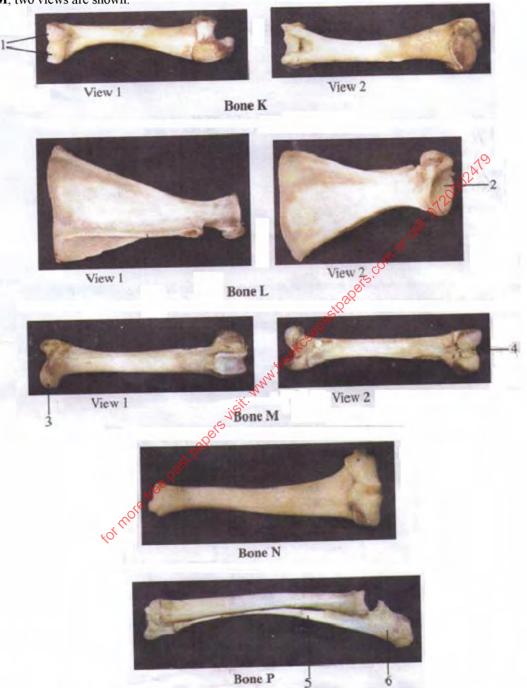
- Mix equal volumes of glucose and starch powder to form solution X.
- Provide every student with 10mls of solution X in a test tube.
- Biuretes reagents (0.75gm of copper sulphate crystals in a litre of 2M of potassium hydroxide).
- Germinate maize plant to have at least 3 leaves.
- Provide each student with a maize seedling labelled specimen Q.

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CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2016

231/3 BIOLOGY PAPER 3 (PRACTICAL) JULY/AUGUST, 2016 TIME: 1¾ HOURS

1. The photographs labelled **K**, **L**, **M**, **N** and **P** below are bones obtained from a mammal. For each of the bones **K**, **L** and **M**, two views are shown.



(a) Identify the bones and name the part of the mammalian body from which each was obtained.
(5mks)
Name the parts labelled 1, 2 and 4.
(3mks)

(c) Name the bones that form a joint with bone **K** at its anterior and posterior end and in each case name the type of joint they form.

(4mks)

Anterior end.

- (i) Bone(s)
- (i) Bone(s)

				Biology p1, p2&p3
		(ii)	Type of joint	
	(d)	State	the function of the structure labelled 6 in bone P .	(1mk)
2.	You a	re provio	ded with specimen Q.	
	(a)	(i)	Draw and label the specimen.	(5mks)
		(ii)	State the magnification.	(1mk)
	(b)	State	the function of any three parts you have labelled in (a) above.	(2mks)
	(c)	(i)	Name the class to which specimen Q belongs to.	(1mk)
		(ii)	Give the reason for your answer above.	(1mk)
	(d)	What	type of germination is exhibited by specimen Q?	(1mk)
3	Vou	ra provid	led with a sample of food labelled Y and solution I (judine solution), solution K (Re	modicte colution) and

You are provided with a sample of food labelled X and solution J (iodine solution), solution K (Benedicts solution) and solution L (Biurets reagent). Carry out tests on the food sample to identify the type of food substance present.

			(13mks)
Food being	Procedure	Observations	Conclusion
tested for			
		a AT	P
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KIRINYAGA CENTRAL SUB-COUNTY EFFECTIVE FORTY JOINT EXAMINATION – 2016

231/1 BIOLOGY PAPER 1 (THEORY)

JULY/AUGUST, 2016 TIME: 2 HOURS

1. (a) Define the term growth.

(1 mark)

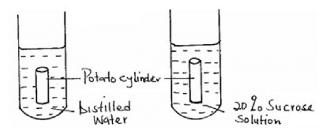
- (b) Name the tissue in plants responsible for:
- (i) Primary growth.

(1 mark)

(ii) Secondary growth.

(1 mark)

2. Two potato cylinders were carefully dried on a blotting paper and weighed. Each piece weighed 2 grams. One was placed in each test tube as shown in the diagram below.



(a) After 48hrs, which potato cylinder will be heavier. Explain.

(2 marks)

- (b) Name the substance whose movement was responsible for the weight changes in the potato cylinder you identified in (a) above. (1 mark)
- (c) Name the process which was responsible for the movement of the substance you identified in (b) above.
- (1 mark)
- Why are the following steps taken when preparing across section of a leaf for viewingunder the microscope?
- (a) Cutting thin section.

(2 marks)

(b) Placing the section in water.

(2 marks)

4. Below is the dental formula of a mammal.

$$i\frac{0}{4}, c\frac{0}{0}, pm\frac{3}{3}, m\frac{2}{3}$$

(a) What is the total number of teeth?

(1 mark)

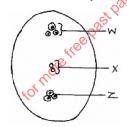
(b) (i) What is mode of feeding in the mammal?

(1 mark)

(ii) Give one reason for your answer above.

(1 mark)

Below is a diagram of a mature embryo sac



(a) Name the parts labelled.

(ii) **Z**

(1 mark)

- (b) Give the name of the part of the seed formed when the part labelled \mathbf{X} fuses with one of the male nucleus.
- (1 mark)

6. The table below shows approximate numbers of organisms found in anecosystem.

Type of organism	Numbers
Grasshoppers	Many
Hawks	3 – 4
Snakes	15 – 30
Green plants	Very many
Lizards	80 – 120

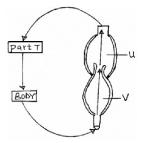
(a) Using the information in the table draw a pyramid of numbers.

(3 marks)

b) Explain what would happen to the other organisms if all the lizards suddenly died off.

(2 marks)

7. The diagram below show single circulation a fish.



(a) Write down the names of the parts labelled U and V.

(2 marks)

(b) Explain the main disadvantage of this type of circulation.

(1 mark)

Mr. Juma has sued Serenity Hospital on grounds that their child was wrongly identified such that they got the wrong one. The child is blood group O. Mr. Juma is blood group AB while Mrs. Juma is heterozygous blood group A.

(a) Work out the possible blood group of their offsprings.

(4 marks)

(b) Is Mr. Juma justified in his claims?

(1 mark)

(a) Name the bacteria found in the root nodules of leguminous plant.

(1 mark)

(b) What is the role of the bacteria named in (a) above?

(1 mark)

10. (a) Which substance in the cigarettes smoke may cause lung cancer.

(1 mark)

(b) The table below shows differences in air breathed in and out.

Volume of air breathed in Volume of air breathed out Gas 21.00 Oxygen 16.00.

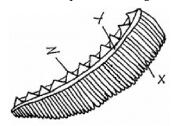
4.000

0.04

What is the reason for there differences.

(2 marks)

11. The diagram below represents an organ of gaseous exchange.



What is the name of the organ?

Carbon (IV) oxide

(1 mark)

(b) Name the class to which the animals that have the organ you identified in (a) above belongs.

(1 mark

State one way in which structure X is adapted for gaseous exchange.

(2 marks)

12. In a prolonged drought period, forage was scaree. It made animals reach out for higher forage and this way the giraffes got the stretched long necks.

What is the term used for a characteristic such as the long necks outlined?

(1 mark) (1 mark)

(b) What is the name given to the theory that describes the evolution of such structures like the long necks?

(c) State and explain the limitation of the theory you named in (b) above.

(2 marks)

(1 mark)

13. (a) A goat weighing 20kg requires 216KJ while a mouse weighing 54gms requires 2830KJ per day. Explain. (2 marks)

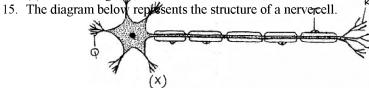
(b) What is the end products of respiration in plants when there is insufficient oxygen supply?

14. State the functions of the following male hormones.

(a) Follicle stimulating hormone.

(1 mark (1 mark)

(b) Luteinizing hormone.



(a) Identify the nerve cell.

(a) Calculate the RQ of tripalmitin.

(1 mark)

(b) Give a reason for your answer in (a) above. (c) State the function of the part labelled **T**.

(1 mark) (1 mark)

(d) Using an arrow show the direction of an impulse on the diagram.

(1 mark)

16. A food substance called tripalmitin C₁₅H₉₈O₆ was oxidized fully and the following equation worked out.

 $2C_{51}H_{98}O_6 + 145O_2 \rightarrow 102CO_2 + 98H_2O$

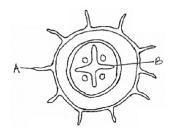
(2 marks)

(b) From the RQ value obtained above, to what group of food substances does tripalmitin belong.

(1 mark)

17. The diagram below represents a cross section obtained from a plant. Use it to answer the questions that follow.

(2 marks)

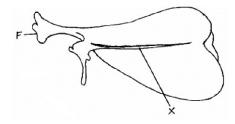


(a) From which part of the plant was the section obtained from:	(1 mark)
(b) Give a reason for your answer in (a) above.	(1 mark)
(c) Name part B .	(1 mark)
(d) Name the material that strengthens the part you named in (c) above.	(1 mark)
. (a) Given a sample of urine, name one test you would carry out to determine if it was obtained from a	person suffering from
diabetes mellitus.	(1 mark)
(b) What results are expected if one is diabetic?	(2 marks)

19. The diagram below represents a bone of a mammal.

(c) Explain why sugar appears in the urine of a diabetic.

18.



(a) Identify the bone.
(b) Name the part marked X.
(c) Name the bone that articulates at the part labelled F.
(d) Explain one way in which the bone is adapted to its function.
(1 mark)
(20. (i) Name the class in the phylum arthropoda with the largest number of individuals.
(ii) State three adaptations that makes this class very successful.
(3 marks)

21. The diagram below represents a cell organelle.

(i) Name the organelle above.	(1 mark)
(ii) State it's function.	(1 mark)
(iii) Identify the structures labelled X and state it s functions.	(2 marks)
22. (a) In which organ is cardiac muscle found.	(1 mark)
(b) What is the function of the cardiac muscle in the organ you have named in (a) above.	(1 mark)
23. How does carboxyhaemoglobin lead to death?	(2 marks)

KIRINYAGA CENTRAL SUB-COUNTY EFFECTIVE FORTY JOINT EXAMINATION - 2016

231/2 BIOLOGY PAPER 2 (THEORY)

JULY/AUGUST, 2016 TIME: 2 HOURS

SECTION A: (40 MARKS)

Answer all the questions in this section in the spaces provided:

1. The diagrams below represents germination in plants.



(a) Name the type of germination in A and B above.

(1 mark)

(b) In seed germination, the radicle grows before the shoot. Explain.

(2 marks)

(c) Define the term seed dormancy.

(1 mark)

(d) State **two** causes of seed dormancy.

(2 marks)

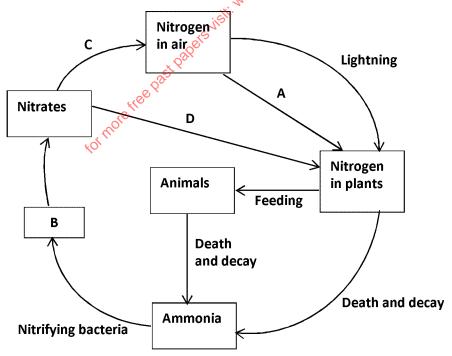
(e) State **two** roles of water in seed germination.

- (2 marks)
- 2. During a strenuous exercise, the chemical process represented by the equation below takes place in human muscles.

 $C_6H_{12}O_6 \rightarrow 2CH_3 CH (OH) COOH + 150kJ$

(Substance X)

- (a) Name the process. (1 mark)
- (b) Name substance X. (1 mark)
- (c) State **two** economic importance of the above process. (2 marks)
 (d) Explain what happens to X after the exercise. (2 marks)
- (d) Explain what happens to X after the exercise. (2 marks)
 (e) State **two** differences between aerobic respiration and photosynthesis. (2 marks)
- 3. The diagram below represents the nitrogen cycle.



(a) Identify the processes labelled **A** and **D**.

(2 marks)

(b) Name the compound represented by **B**.

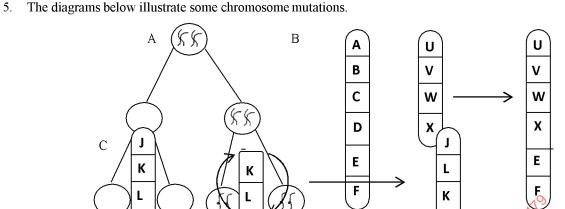
(1 mark)

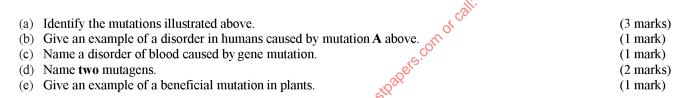
(c) Name the group of organisms labelled C.

(1 mark) (1 mark)

(d) (i) Name the group of plants that promote process A.

		Biology p1, p2&p3
	(ii) In which part of the plant does process A take place?	(1 mark)
	(e) How would excess pesticides in the soil interfere with process A?	(2 marks)
4.	(a) Explain what happens when a wilting young plant is well watered.	(3 marks)
	(b) Name a support tissue in plants thickened with:	
	(i) Cellulose.	(1 mark)
	(ii) Lignin.	(1 mark)
	(c) Describe the role of the liver in deamination.	(3 marks)
_	ment at a state of the state of	





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SECTION B: (40 MARKS)

Answer question 6 in Section B (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

The hormone Human Chorionic Gonadotrophin (HCG) is released from embryonic tissues. The effects of HCG is to prevent the degeneration of corpus luteum.

Study the table below, which shows changes in concentration in the blood of HCG and progesterone during the first 36

weeks of pregnancy.

Time in weeks	Concentration of HCG	Concentration of progesterone	
	(arbitrary units)	(arbitrary units)	
0	0	7	
2	3	7	
4	15	8	
8	60	9	
12	45	10	
16	24	11	
20	12	13	
24	10	15	
28	10	20	
32	14	30	
36	12	55	

(a)	Using the grid provided, plot graphs of concentration of HCG and progesterone produced against time.	(8 marks)
(b)	(i) What is the concentration of HCG progesterone in week 11?	(2 marks)
	(ii) When are the two hormones equal in concentration?	(2 marks)
	(iii) Account for the changes in HCG concentration during the first 20 weeks of pregnancy.	(4 marks)
(c)	State three functions of progesterone.	(3 marks)
(d)	What is the role of testosterone in a human male?	(1 mark)
7.	(a) State three processes by which flowering plants excrete waste products and for each process name two	waste products
	that are eliminated.	(6 marks)
(b)	Describe the functions of the various components of the mammalian blood.	(14 marks)
8.	Describe the movement of water from the soil to the leaves of a tall plant.	(20 marks)

231/3 **BIOLOGY** PAPER 3 (PRACTICAL) **JULY/AUGUST 2016** TIME: 1¾ HOURS

CONFIDENTIAL

KIRINYAGA CENTRAL SUB-COUNTY EFFECTIVE FORTY JOINT EXAMINATION – 2016

Each candidate should be provided with the following items:

- 80ml of iodine solution, in a 100ml beaker.
- 8cm visking tubing.
- 2 pieces of strong cotton thread 20cm long.
- Means of timing/wall clock.
- 10ml measuring cylinder.
- 100ml water in 250ml beaker.
- 10ml of 10% starch solution labelled X.
- Specimen A a twig of hibiscus with a flower.
- Specimen B a twig of grass.

KIRINYAGA CENTRAL SUB-COUNTY EFFECTIVE FORTY **JOINT EXAMINATION – 2016**

231/3 **BIOLOGY** PAPER 3 (PRACTICAL) **JULY/AUGUST, 2016** TIME: 1¾ HOURS

You are provided with iodine solution, visking tubing, a beaker and a solution labelled X. Tie one end of the tubing tightly using the thread provided. Measure 5ml of solution X and pour it into the visiking tubing. Tie the other end of the tubing tightly. Ensure there is no leakage. Rinse the outside of the tubing with distilled water and immerse it with its contents in a beaker containing iodine solution. Allow it to stand for 15 minutes.

(i) Record your observation at the beginning and end of the experiment in the table below

Record your observation at the beginning and end of the experiment in the table below.			
Experimental set up	Solution X inside the tubing	Iodine solution outside the tubing	
Beginning of experiment	OSE STATE OF THE PROPERTY OF T		
End of experiment	200g		

(ii) What was the identity of solution X? (1 mark)

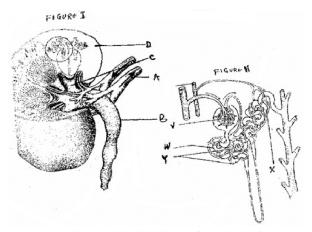
(1 mark) (iii) Suggest the nature of visking tube.

(iv) Account for the results obtained in a (i) above. (4 marks)

(b) (i) Which physiological process was being investigated in this experiment? (1 mark)

(ii) State two factors which affect the process being investigated.

Study the kidney diagrams below.



(a) (i) Name the parts labelled A, B, C and D in figure 1. (4 marks) (2 marks)

Name the processes that take place in the parts labelled. (ii)

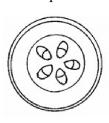
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(2 marks)

		Biology p1, p2&p3
	X	
	(b) State two adaptations of the part labelled W.	(2 marks)
	(c) On the diagram name the part where counter current flow occurs.	(1 mark)
	(d) State two homeostatic functions of the diagram above.	(2 marks)
	(e) Explain what will happen to the process of urine formation in absence of vasopressin hormone.	(4 marks)
3.	You are provided with the following plants: A twig of plant A and plant B. (a) (i) Name the sub-division to which specimen A belong. (ii) Using an observable characteristic only give a reason for your answer in (a) (i) above. (1 mark)	(1 mark)
	(b) Name the class to which the two specimens belong. A	(2 marks
	(c) State two observable differences between the leaves of specimen A and B .	(2 marks)
	Leaves of A Leaves of B	` ,

(d) The diagrams below shows the cross-section of stems obtained from specimens A and B.





(i) Which diagram represents the stem of each of the specimen?
 (2 marks)
 (ii) Outline two differences between the two transverse sections.
 (2 marks)
 (2 marks)
 (3 marks)
 (4 marks)
 (5 we a reason for your answer.
 (1 mark)

KEIYO SOUTH JOINT EXAMINATION 2016

Kenya Certificate of Secondary Education

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3.

BIOLOGY

PAPER 1

THEORY 2 HOURS

Distinguish between Attenuation and Vaccination

(2marks)

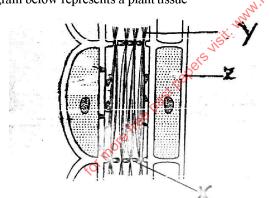
The number and distribution of stomata on three different leaves are shown in the tablebelow; 2.

Number of stomata

Lea	of Upper Epidermis	Lower epidermis
Α	300	0
В	150	200
C	4	13
a)	Suggest the possible habitat of each of the plant	from which the leaves were obtai

- (3marks) (2marks)
- State the modification that maybe found in the stomata of leaf C b)
- a) what is sex linkage? (1mark
- b) Name the sex linked trait that are only in male (2marks)
- A student was using a microscope whose eyepiece lens was marked X4. The high powered objective lenses were marked X10. Calculate the total magnification of the microscope (2marks)
- State the functions of the following; (3marks)
 - i) Lysosomes
 - ii) Ribosomes
 - iii) Mitochondrion
- What is apical dominance (1mark)
- Why does a membrane form around the egg after fertilization? (1mark) Give three differences between an egg and a sperm (3marks)
- Explain why the biomass of producer is greater than that of primary consumer in a balanced ecosystem (1mark) 8

 - a) What is diabetes mellitus? (1mk)
- b) How can it be controlled? (1mk)
- 10. State differences between Aerobic and Anaerobic respiration (2mks)
- 11. State three adaptations of alveolus of a mammal for gaseous exchange (3mks) 12. Explain how the root hairs are adapted to their functions (2mks)
- 13. The diagram below represents a plant tissue



- Identify the tissue above (1mark)
- Name the structure labeled X,Y and Z (3marks)
- 14. State three characteristics unique to class Insecta (3marks)
- Name two disorders in human caused by gene mutation (2marks)
 - Give two examples of continuous variation in plants (2marks)
- 16. Describe how oxygen in the alveolus reaches the red blood cells (2marks)
- 17. Name the product of anaerobic respiration in; (2marks)
 - plants a)
 - b) Animals
- 18. State two factors that denature enzymes (2marks)
- 19. State two functions of Saliva (2marks)
- 20. State three structural differences between arteries and veins in mammals (3marks)
- 21. In maize the gene for the purple colour is dorminant for the gene for white colour. A purple colour was crossed with heterozygous plant. Using letter G to represent the gene for purple colour, work out the genotypic ratio of the offspring. Show (5marks) your working.
- (2marks) 22. Explain the Ecological importance of fungi to plants
- 23. Distinguish between community and population (2marks)

	Biology p1, p2&p3
24. Name the disease caused by the following causative agent in human	(2marks)
i) Salmonella typhi	
ii) Plasmodium falciparium	
25. Explain what happens to excess amino acid in the liver of humans	(3marks)
26. Describe what happens when the pollen tube enters the embryo sac	(3marks)
27. State two ways by which human immune deficiency Virus (HIV) is transmitted.	(2marks)
28. Explain why plants do not require specialized excretion organ	(2marks)
29. An experiment was set up as shown below	
Jodine Solution	

a) What are the observations made after 30 minutes in the experiment above

30. Distinguish between epigeal and hypogeal germination

31. The equation below represents a process that takes place in plants

6CO₂+6H₂O → C₀H₁₂O₀+6O₂

a) Name the process above

b) State two conditions necessary for the process to take place in (a) above

(2marks)

(1mark)

(2marks)

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KEIYO SOUTH JOINT EXAMINATION 2016

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BIOLOGY

PAPER 2

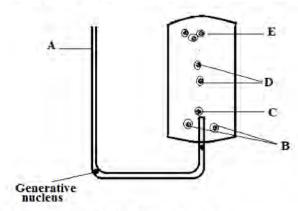
THEORY

2 HOURS

SECTION A (40MKS)

Answer all the questions in the spaces provided

1. The figure below shows the embryo-sac before fertilization.





(b) Identify the structures labelled in the diagram that will develop into the following after fertilization.

(i) Embryo (1 mark)

(ii) Endosperm
(c) State the ploidy of each the following nucleic after fertilization (1 mark)

(i) C (1 mark)

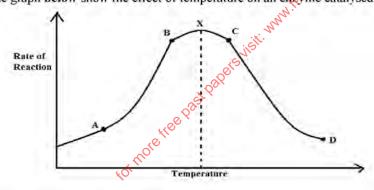
(ii) D

(1 mark)

Briefly outline the process of "double "fertilization in the flowering plants.

(2 marks)

(d) Briefly outline the process of "double "fertilization in the flowering plants.
 The graph below show the effect of temperature on an enzyme catalysed reaction



(a) Account for the shape of the curve between.

(i) A and B	(3 marks)
(ii) C and D	(2 marks)

(b) What does the point marked X represent? (1 mark)

(c) Apart from temperature. State two other factors that affect the rate of enzyme controlled reaction

3. Explain the following(a) (i) When transplanting a seedling, it is advisable to remove some of the leaves. (1 mark)

(ii) There are generally fewer stomata on the upper side of a leaf than on the lower side

(b) Design a simple experiment to illustrate this observation in (a) (ii) (5marks)

4. The following are short messages (sms) on cell phone communication between Mrs. Mkenzie and her husband. They can be

used as analogies of gene mutation

	Intended message	Actual message
1.	I want a drive	I want a driver
2.	Yesterday was my shopping day	Yesterday was my hopping day
3.	My skirt was stolen	My shirt was stolen
4.	Tomorrow I will be visiting my team	Tomorrow I will be visiting my mate

(2 marks)

		Biology p1, p2&p3
	(a) For each of these messages identify the type of gene mutation illustrated	(4marks)
	(b) State one example of chromosomal mutation that lead to	
	(i) Change in chromosomal structure	(1mark)
	(ii) Change in chromosomal number	(1mark)
	(c) Explain why genetic counseling is termed as one practical application of genetics	(2marks)
5.	(a) Describe what happens in the first phase of aerobic respiration.	(3marks)
	(b) A student divided a small air tight box into two chambers with wire mesh. In one chamber he kept a	number of rats and
	in the other a number of potted plants. What was likely to happen if the box was placed in the dark for	or two hours?
	Explain your answer.	(3marks)
	(c) Explain how Aerenchyma tissue are adapted to their functions	(2marks)
	SECTION B (40MKS)	
	Answer Question 6 (compulsory) and any other one question (7 or 8) in the spaces provided after questi	on
6.	In an ecological study, a grass hopper population and that of crows was estimated in a certain grassland ar	ea over a period of
	one year. The results are as shown in the table below;	
		O N D

(i) What is the relationship between the rainfall and grasshopper population? (ii) Account for the relationship stated in a(i) above. (3marks)												
Amount of rainfall	20	0	55	350	520	350	12	10	25	190	256	350
No. of crows	4	2	0	1	8	22	7	2	1	1	5	15
No. of adult grasshoppers x 10 ²	90	20	11	25	2500	1652	120	15	10	35	192	456
MONTH	J	F	M	A	M	J	J	A	S	O	N	ע

a. Explain the relationship between the grass hopper population and that of the crows. (3marks) b. If the data was used in the construction of pyramid of numbers, what would be the prophic level of:-(3marks) i) Grasshopper ii) Crows iii) The grass in the study area. If the area studied were one square kilometer, state-One method that could have been used to estimate the crow population (1mark) (1 mark) ii) One method that could have been used to estimate the grass hopper population. Suggest what would happen if a predator for grasshoppers entered the study area (2 marks) f. What is meant by the term carrying capacity? (1mark) Why would the carrying capacity of wild animals in woodland grassland be higher than that of cattle? (2marks) What is an ecosystem? (1mark) h. Habitat i. (1mark) j. 7. Ecological niche (1mark) Explain the role of human skin in;-Thermo regulation (14marks) (a)

Explain various ways in which fruits and seeds are adapted to dispersal.

Protection

(b)

(6marks)

(20 marks)

KEIYO SOUTH JOINT EXAMINATION 2016

Kenya Certificate of Secondary Education

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BIOLOGY

PAPER 3

THEORY

2 HOURS

CONFIDETIAL

- Specimen Q –Irish potato tubers
- o Solution S- Strong salt solution
- o Solution R- Distilled water
- o Pestle and mortar
- 4 test tubes
- o Source of heat
- Test tube holder
- Scalpel
- o Iodine solution
- o Benedict"s solution
- o Sodium hydroxide
- o Copper sulphate solution.
- Means of timing

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KEIYO SOUTH JOINT EXAMINATION 2016

Kenya Certificate of Secondary Education (K.C.S.E)

231/3

BIOLOGY

PAPER 3

TIME: 1 3/4 HOURS

- You are provided with specimen labelled Q. cut the specimen into two halves.
- (a) Cut four rectangular strips from one half of specimen Q, each strip should be of 20mm long and 5mm wide. Place two stripes into solution R and the other two strips into solution S. Allow the experiment set ups to stand for 10 minutes.
- Using your fingers feel the texture of the strips and record your observations from each solution:

Solution R (1mark)

Solution S (1mark)

(ii) Account for your observations of no (i) above.

(4marks)

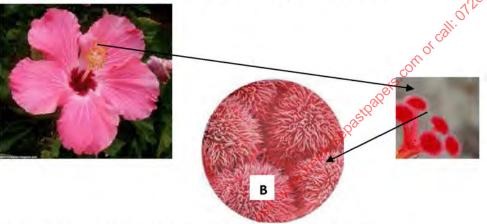
(b) Peel the other half of specimen Q, cut into small pieces and then crush in a mortar. Use the reagents provided to test for the various food substances in the extract obtained from the crushed material.

Record the procedures, observations and conclusions in the table below.

(9marks)

Food substance	Procedure	Observations	Conclusion		
			10		

Below is a photograph of plant part. Use it to answer questions that follow:



- (a) Name the sub-division of the plant from which the photo was taken. (1mark)
- (b) Using observable features on the photograph give reasons for your answer in (a) above. (1mark)
- (c) Name the agent of pollination for the flower in the photograph (1mark)
- (d) State three observations on the photograph that supports your answer in (c) above. (3marks)
- (e) Name the class of the plant from which the photo was taken. (1mark)
- (f) Using observable features on the photograph, give reasons for your answer in (e) above.
- (3marks) (g) Give two adaptations of the part labeled **B** to its pollination function. (2marks)
- 3. The photographs in Plate J A and L shows the anterior part of two different animals,

Plate L shows the longitudinal dissection of Plate K. Examine the photographs and answer the questions below.



PLATE J PLATE K



PLATE L

(a)	(i) State the class to which the animal organ in Plate J belongs.	(1mark)
	(ii) State the habitat of the animal.	(1mark)
	(iii) Give a reason for your answer in (ii) above.	(1mark)
(b)	(i) Name the organ shown in the photograph in Plate J.	(1mark)
	(ii) State the function of the organ named above (i).	(1mark)
	(iii) Name the structure that protects the organ named in (b) (i) above from mechanical damage	(1mark)
	(iv) From observable features explain two adaptations of the organ to its function.	(2marks)
(c)	(i) Identify the structure in the photograph Plate K and L.	(1mark)
	(ii) Give a reason for your answer.	(1mark)
	(iii) Using observable features only state three adaptations of the structure K to its functions	(3marks)

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...e structure K to its function

MOKASA JOINT EVALUATION EXAMINATION

Kenya Certificate of Secondary Education 231/1 BIOLOGY

(Theory)

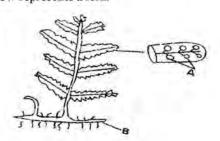
2 hours

2.

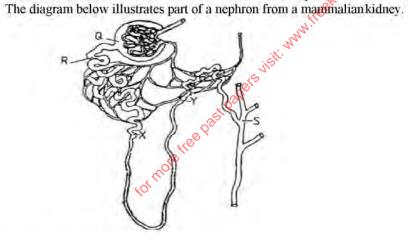
1. N	lame the	tissues	whose	cells	are t	hickened	with:
------	----------	---------	-------	-------	-------	----------	-------

a)	Cellulose and pectin.	(1mk)
b)	Lignin.	(1mk)

The diagram below represents a fern.

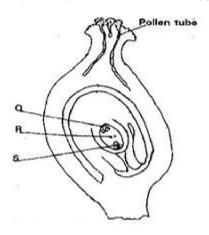


	(a) Name Parts labeled A and B.	(2mark)
	(b) To which division does the plant belong?	(1mark)
3.	State three measures that can be taken to control infection of man by protozoan parasites	(3mark)
4.	Explain how the following factors hinder self pollination in plants:	,
	(i) Protogyny	(1mark)
	(ii) Dioecism	(1mark)
5.	Explain the likely effect on humans and other organisms of untreated sewage discharged into water body	that supplies water
	for domestic use.	(3mk)
6.	Name two structures in herbaceous stems that enhance their support.	(2mk)
7.	a) Define the term immunity.	(1mk)
	b) Distinguish between natural immunity and acquired immunity.	(1mk)
	c) Identify one immunizable disease in Kenya.	(1mk)
8.	State three differences between osmosis and active transport.	(3mk)
12		



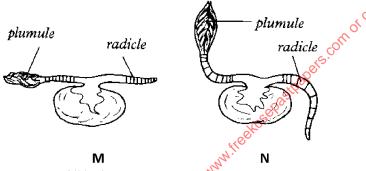
Name the fluid found in the part labeled Q.	(1mk)
 b) Identify the process responsible for the formation of the fluid named in (a) above. 	(1mk)
c) Which two hormones exert their effect in the nephron?	(2mk)
 State three characteristics of members of kingdom Monera that are not found in other kingdoms. 	(3mk)
11. What is meant by the following biological terms?	
i) Crenation	(1mk)
ii) Haemolysis	(lmk)
iii) Plasmolysis	(1mk)

12. The diagram below shows a stage during fertilization in flowering plant.



a) Name the parts labeled Q, R, and S.
b) State the function of the pollen tube.
3. a) State the major factor in the "Global warming" experienced in the world today.
b) Suggest two ways of reducing the Global warming.
(2mk)

14. An experiment was set to investigate a certain aspect of response. A seedling was put on a horizontal position as shown in figure M below. After 24 hours, the set up was as shown in figure N.



a) Name the response exhibited.
 b) Explain the curvature of the shoot upwards.
 (1mk)
 (3mk)

15. The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.

a) Name the evolutionary process that may have given rise to these structures. (1mk)

b) What is the name given to such structures? (1mk)
c) Give two examples of vestigial organs in man. (2mk)

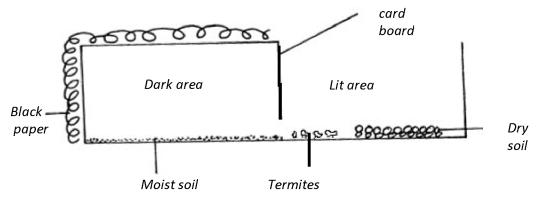
16. a) Name a protein and vitamin involved in blood clotting.

i) Protein. (1mk)

ii) Vitamin (1mk)

b) Explain why blood is not normally used for transfusion after one month. (1mk)

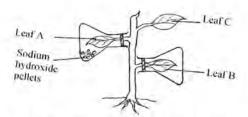
17. A group of Form four students set up an experiment to investigate a biological process using termites. They used a small box in which a portion was covered with black paper and had moist soil. The open part had dry soil. Termites were placed inside in open area of thebox.



a) Predict what happened to the termites after 30 minutes. (1mk)
b) What form of response is exhibited by termites? (1mk)

c) State one biological significance of the above response to termites. (1mk)

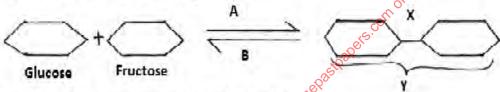
- 18. a) Name two fins in a bony fish which perform the following functions:
 - i) Changing direction. (1mk) ii) Control pitching. (1mk)
 - ii) Control pitching. (1mk)
 (b) State the role of myotomes in fish. (1mk)
- 19. The diagram below represents an experimental set up to investigate a certain scientific concept. The potted plant was first destarched by keeping it in dark for four days.



The set up was then placed in sunlight for five hours and leaves were tested for starch.

- a) What scientific concept was being investigated? (1mk)
- b) i) Give the results likely to be obtained after starch test for A and B.

 Account for the results in leaf A in h (i) shows.
- ii) Account for the results in leaf A in b (i) above. (1mk)
- c) Why was leaf C included in the set-up? (1mk)
- 20. a) Explain the importance of transport in plants. (2mk)
- b) What is the role of root hairs in plants? (1mk)
- 21. a) Identify the source of urea that is removed via the kidneys in a healthy human being (1mk)
- b) Explain why a pregnant woman excretes less urea compared to a woman who is non-pregnant. (2mk)
- 22. Study the reaction below and answer the questions that follow.



- a) What biological processes are represented by A and B (2mk)
- b) Identify the product Y. (1mk)
- c) State the bond represented by X. (1mk)
- 23. Explain the events of the light stage of photosynthesis. (3mk)
- 24. Explain what happens in humans when the concentration of glucose in the blood rises above the normal level. (3mk)
- 25. a) Outline the main features of Lamarckian theory of evolution. (2mk)
- b) In view of modern genetics, explain why camarck's theory is unacceptable. (1mk)
 - c) Name one factor in nature that increases the process of evolution. (1mk)

to more tree?

MOKASA EXAMINATIONS

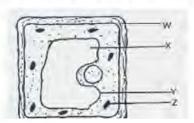
231/2 BIOLOGY PAPER 2 THEORY

TIME: 2 HOURS

SECTION A (40 MARKS)

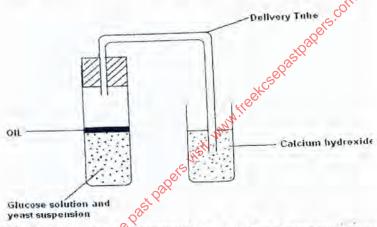
Answer all the questions in this section.

1. Examine the diagram below carefully and use it to answer the questions that follow.



	(a) Name the parts X, Y and Z.		(3 marks)
	(b) State the main substance which make-up the part lab	beled W.	(1 mark)
	(c) Name the process through which mineral salts move	into the structure labeled X.	(1 mark)
	(d) Explain what happens to a red blood cell when place	ed in distilled water.	(3 marks)
2.	2. (a) What is meant by natural selection?	100	(4 marks)
	(b) State four sources of evidences that support the theo	ry of organic evolution.	(4 marks)

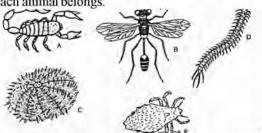
The diagram below shows a set up that was used to demonstrate a certain physiological process.



The glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before adding yeast suspension.

- (a) Identify the physiological process that was being investigated using the above set up. (1 mark)
- (b) Why was glucose boiled during the experiment? (1 mark)
- (c) What was the importance of cooling the glucose before adding the yeast suspension? (1 mark)
- (d) What observation would be made in test tube at the end of the experiment? (1 mark)
- (e) How would the observation made in (d) above be affected if oil was not added on top of the yeast suspension during the experiment?
- (f) In another investigation, a bird was found to use 10 litres of oxygen to give a respiratory quotient of 0.7 during period of flight. Name the type of food that was being respired by the bird and determine the amount of carbon (IV) oxide produced during the same flight. (3 mark)
- Pure breed of red cows and pure breed of white bulls were crossed to give F₁ calves which had a mixture of red and white coat known as roan. The F₁ were selfed.
 - (a) Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F₂. (4 marks)
 - (b) Work out the genotypic ratio of a cross between F₁ offspring and white bull. (3marks)
 - (c) Comment on the gene(s) controlling the colour of coats in cattle mentioned above. (1mark)

5. You are provided with photographs of animals. Study the photographs and the dichotomous key below to enable you identify the taxonomic group to which each animal belongs.



KEY

1.	a) Jointed legs	present	
			go to 7
2.			go to 3
			go to 5
3.			go to 4
	b) Wings abser	nt	Anoplura
4.			Diptera
5.	a) Four pairs of	f legs	Arachnida
			go to 60
6.	a) One pair of	legs in each body segment.	
			ıt
7.			Mollusca
	b) Body surface has spiny projection		
a)			misms to their taxonomic groups. In each case, give the sequence of steps which you
	followed in ide	entifying them.	(4 marks)
	Animal	Identity	Steps followed
	A	1	*00°
	В		200
	D		cs ^{oX}
			1 12

b) i) Using observable features only, state the class to which the animal labeled A and B on the photographs above belong

(2 marks)

State two observable features on B, that enabled you to arrive at that answer in (b (i) above.

(2marks)

SECTION B (40 MARKS)

Answer question six (6) in the spaces provided (compulsory). Choose either question 7 or 8 and answer in the space provided after question 8.

- During an ecological study of a lake, a group of students recorded the following observations.
 - Planktonic crustaceans feed on planktonic algae;
 - (ii) Small fish feed on planktoffic crustaceans, worms and insect larvae;
 - (iii) Worms feed on insect larvae;
 - (iv) A bird species feeds on small fish, planktonic crustaceans, worms and large fish;
 - (v) Insect larvae feed on planktonic algae;
 - (vi) Large fish feed on small fish.
- (a) From this record of observations, construct a food web.

(4 marks)

- (b) From the food web, isolate and write down a food chain that ends with:-
 - (i) Bird species as a secondary consumer.

(1 mark) (1 mark)

- (ii) Large fish as a tertiary consumer. (c) The biomass of the producers in the lake was found to be greater than that of primary consumers. Explain this observation.
- (2 marks) (d) Using the food web, identify three pairs of organisms that compete for food in the lake and for each case, name the food being
- competed for. (e) (i) State three ways by which human beings may interfere with this lake ecosystem.

(6 marks) (3 marks)

(i) Explain how each of the ways stated in (e) (i) above may affect life in the lake.

(3 marks) (13 marks)

(a) Describe the digestion of a starchy meal along the humanalimentary canal. (b) Describe the process of urea formation.

(7 marks)

(a) Describe how gaseous exchange occurs interrestrial plants.

(13 marks)

(b) Describe the process of metamorphosis in a grasshopper.

(7 marks)

MOKASA EXAMINATIONS

231/3

BIOLOGY

PAPER 3

Practical

Confidential

Requirements

- Thread
- 250ml beaker
- Distilled water
- Glass rod
- Iodine solution
- Benedict"s solution
- Means of heating
- 10% glucose solution
- 1% starch solution
- 10cm visking tubing
- 4 test tubes on a rack
- S Datora
- R Maize fruit
- L Orange
- K Bean pod
- M Mango
- Hand lens

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MOKASA JOINT EVALUATION EXAMINATIONS

K.C.S.E (Kenya Certificate of Secondary Education)

231/3

BIOLOGY

PAPER 3

PRACTICAL

MARCH/APRIL, 2016 TIME: 1 3/4 HOURS

1. You are provided with a visking tubing. Open one end and blow air through the open end. Tie firmly one end with a piece of thread provided. Make sure that it is not leaking.

Put into the tubing equal quantities of solution L1 and L2. Tie with a thread the open end and ensure that the thread is long enough to suspend the visking tubing from the glass rod as shown in the diagram.

Put the tubing suspended in distilled water as shown above. Let the set up stand for 30 minutes.

As you wait, carry out the food tests on solution L1 and L2 separately. Use only the reagents provided and fill the table below.

(6 marks)

a)

d)

	Test	Procedure	Observation	Conclusion
			2	× '
L1			000	
			011	
L2			call.	

b) Remove some solution from the beaker after 20 minutes from the time you set the experiment and test for the two food compounds you tested in (a) above

Test	Observation	Conclusion
		Sas
		C SON

(2 marks)

(3 marks)

(5 marks)

(1 mark)

Add 3 drops of iodine solution into the beaker. After 6 400 minutes, what do you observe in;

(i) The beaker (1 mark)

(ii) Visking tube (1 mark)

- What physiological process is being tested in step (b) and (c) above (1 mark)
- e) Account for your observations in steps (b) and (c)
 2. Below is a photograph of an organism. Examine it and answer the questions that follow.
- The actual length of the pair of scissors next to the organism is 12.5cm. Using this information, calculate actual length of the organism. (4 marks)
- b) The photograph below shows structures visible after removing the parts labelled P. The inset is a magnified view of one of the structures.
- (i) Name the parts labelled R/S and T (3 marks)
- (ii) Explain how each of the parts named in (i) above is adapted to its function (3 marks)
- The photograph below shows the inner surface of the upper left side of the ribcage.

Explain the role of the part labelled M in inhalation (4 marks)

- 3. (i) Identify the fruits labelled S.L.K. and M
 - (ii) Give a reason for your identify of the specimen: S.R and M (3 marks)
 - (iii) Briefly describe any two types of placentations found in the fruits provided in 3(i) above (2 marks)
 - (iv) State one difference between a seed and a fruit
 - (v) Using the handlens provided draw the fruit labelled R (3 marks)

KAMDARA JET - 2016

231/1

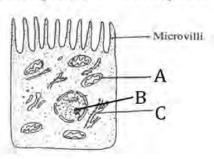
BIOLOGY

TIME: 2 Hours

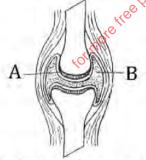
Instructions to Candidates

Answer all the questions in the spaces provided.

The diagram below represents microvilli on epithelial cells



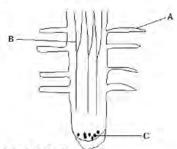
	(a) Name the parts A and C	(2marks)
	(b) Name two parts in the human body where the above epithelial cells are found.	(2marks)
2.	(a) Name two enzymes that are produced in their precursor forms.	(2marks)
	b) Name the substance that converts the enzymes named above to their active forms.	(2marks)
3.	Human beings are "Homoiothermic.	
	(a) Explain the meaning of homoiothermic.	(1mark)
	 (a) Name two enzymes that are produced in their precursor forms. (b) Name two enzymes that are produced in their precursor forms. (c) Name the substance that converts the enzymes named above to their active forms. (d) Human beings are "Homoiothermic. (e) What are the effects of the following in human beings? (f) Decrease in body temperature below the entire product of the following in human beings? 	(2marks)
	(i) Decrease in body temperature below the optimum level	
	(ii) Increase in body temperature above the optimum level.	
	(iii) The pancreas of a mammal was surgically removed. A few hours later, glucose was found in urine of the	mammal.
	Explain the observation.	(1 mark)
4.		
	urine and stool contained blood.	
	(a) Name the disease the person was likely to be suffering from and the causative agent of the disease	
	(i) Disease	(1mark)
	(ii) Causative agent	(1mark)
	(b.) Apart from avoiding walking bare feet in swampy area. State two other ways of controlling the disease.	(2marks)
5.	State the functions of the following parts of a brain:	(3marks)
	(a) Thalamus	
	(b) Midbrain	
	(c) Medulla oblongata	
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The diagram below shows a joint in a mammal. Study it and answer thequestions.

	(a) State the functions of parts A and B	(2marks)
	(b) Name the type of joint illustrated by the diagram	(1mark)
	(c) State two adaptations of joint named in (b) Above	(2marks)
7.	(a) What is mutation?	(1mark)
	(b) Name one disorder caused by gene mutation and one disorder caused by chromosome mutation.	(2marks)
	Gene mutation	
	Chromosome mutation	
8.	(a) What is the disadvantage of self- pollination in plants?	(1mark)
	(b.) State two features that discourage self-pollination.	(2marks)
9.	State the importance of companion cell in phloem tissue.	(1mark)
10	State TWO effects of gibberellins on shoots of plants.	(2 Marks)

- 11 Distinguish between resolving power and magnifying power of a microscope (2 Marks)
- 12. The following diagram is a longitudinal section of a root apex.



Identify the parts labeled A, B and C

(3 Marks)

b. The figure below represents THREE cells 1, 2, and 3.







3

Identity the THREE regions of the root tip from which the cells were got from,

(3 Marks)

13. a) What is heterozygous advantage?

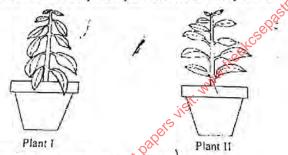
(1 Mark)

b) Give an example.

15. What is meant by speciation?

- (1 Mark)
- 14. After a colony of penicillin-sensitive bacteria was exposed to antibiotic pencillin, a penicillin resistant emerged. Explain this observation (2 Marks)
 - (2 Marks)

16. The diagram below shows two potted plants on a laboratory bench near a window.



a) State one observable difference between the plants I and II.

(1mark)

b) State the importance of the process that is seen in plant I.

(1mark)

c) Explain the process that resulted to appearance of the leaves as in plant I above.

- (1mark)
- d) Suppose a cell from a leaf of each of the plants I and II is mounted and observed under a microscope. Draw a diagram of a cell from each of the plants leaves. (2marks)
- 17. Study the dental formula below.

$$i\frac{o}{3}$$
, $c\frac{o}{1}$, $pm\frac{3}{2}$, $m\frac{3}{3}$

a) Identify the mode of feeding carried out by the animal with this dental formula.

(1mark)

b) Give reasons for your answer in (a) above.

(1mark)

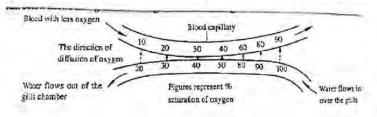
c) State the role of carnassial teeth in a lion..

(1 mark)

- 18. State two reasons why the stomach lining is not usually digested by pepsin though it is made of protein.
- (2marks)

19. State three differences between Rods and Cones.

- (3marks)
- 20. The diagram below shows how gaseous exchange occurs across the gills of a fish.



According to the diagram water and blood flows in opposite direction across the gills.

Give the term used to describe this flow.

(1mark)

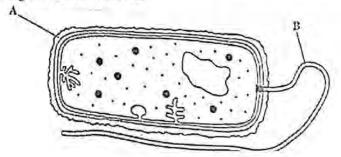
Explain the advantage of the above flow named in (a) above.

(2marks)

What differences would be observed if water and blood flow across the gills in the same direction.

(2marks)

The drawing shows a bacterial cell



Name structures A and B.

(2marks)

State the kingdom to which the cell above belongs. b)

(1marks)

Give two observable reasons for your answer.

(2marks)

22 a) What is the Rhesus factor?

(1 mark)

b) A rhesus negative person received rhesus positive blood during transfusion. Explain why it is dangerous to give similar transfusion a second time. (2 marks)

23. State three adaptive features of a desert plant.

(3 marks)

24. The table below shows the oxygen consumption and carbon dioxide released at rest by a number of animals under certain conditions.

Animal	Body mass(g)	Oxygen consumption in cm ³ per hour	Carbon dioxide released in cm³ per hour	Respiratory Quotient
Mouse	20	40	40	
Dog	10000	1960	2800	
Sheep	40000	4970	7100	
Horse	600000	700000	700000	

Complete the table in the last column showing respiratory quotient.

(2marks)

From the completed table suggest which animal was oxidizing. b)

(2marks)

1) Fats

ii) Carbohydrates

KAMDARA JOINT - 2016

BIOLOGY (THEORY)

Time: 2 Hours **SECTION A:**

Answer all the questions in this section in the spaces provided.

(a) What is meant by the term

(2mks)

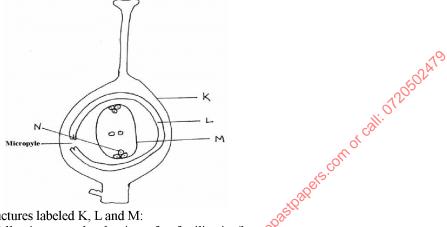
- (i) Allele
- (ii) Test cross
- (b) Describe the following chromosomal mutations:

i) Inversion (1mks)

ii) Translocation (1mks)

(c) In mice the allele for black fur is dominant to the allele for brown fur. What percentage of offspring would have brown fur from a cross between heterozygous black mice? Show your working. Use letter B to represent the allele for black fur.

The diagram below shows a cross – section through a pistil.



(a) Name the structures labeled K, L and M:

(3 marks)

What do the following parts develop into after fertilization?:

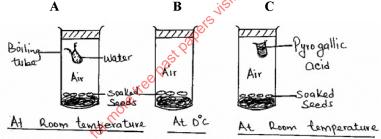
(2 marks)

Part L: Part N:-

State three ways by which plants promote cross fertilization.

(3 marks)

Study the diagrams below and answer the questions that follow.



(a) Identify the process being investigated.

(1mk) (2mks)

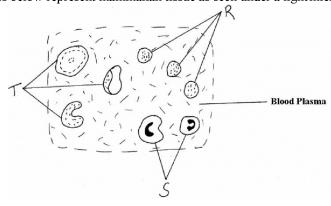
With a reason identify the set-up in which germination will occur.

(2mks)

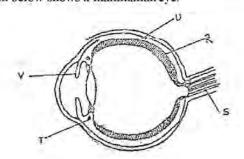
State two roles played by water during germination. Name **three** factors inside the seed that causes seed dormancy. (d)

(3mks)

The figures below represent mammalian tissue as seen under a light microscope.



		Biology p1, p2&
	(a) Identify the (issue	(1 mark)
	(b) Name the cells represented by R,S and T	(3 marks)
	(c) State the function of structure S and R.	(2 marks)
	(d) Explain two adaptations of structure T to its function.	(2 marks)
	(e) Name the hereditary condition a person with structure T is suffering from.	(1mark)
5.	The diagram below shows a mammalian eye.	



a)	Name the parts labeled R, S and T.	(3 mks)
b)	Give two adaptations of part labeled U.	(2 mks)
c)	Describe the changes that occur to part V when one moves from a bright room to a dark room.	(3 mks)

SECTION B

Answer questions 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

Equal grams of maize flour were placed into two boxes K and L respectively. Equal numbers of weevils were then introduced into the boxes. The boxes were kept under similar environmental conditions. The weevils were counted at intervals and the results recorded in the table below.

No. of days after introduction of	Approximate No	of weevils present
weevils	K	160
0	20	20
5	20	20
40	200	300
60	550,00	800
80	560	1300
100	650	1750
120	ii5 640	1750
135	650	1740
150	645	1748

a)	Using a suitable scale and on the same axes draw two graphs of the approximate number of weevils	present against number of
-	days after introduction of weevils on the graph paper provided.	(8marks)
(b)	What were the approximate number of weevils present in the two boxes on the 70th day?	(2marks)
	Number in K :	
	Number in L:	
(c)	(i) On what day was the population of weevils in K 580?	(1mark)
	(ii) Between which days was the population difference greatest?	(1mark)
(d)	Account for the shape of graph L between day 5 and day 100.	(4 marks)
(e)	State factors that would make the human species assume the curve Kabove.	(4marks)
7.	(a) Explain the role of Auxins in geotropic response in plants	(5 marks)
	(b) Describe roles of other hormones in the growth and development of plants:	(15 marks)
8.	a) what is natural selection?	(4marks)
	b) Describe four evidences for organic evolution.	(16marks)

KAMDARA JET - 2016

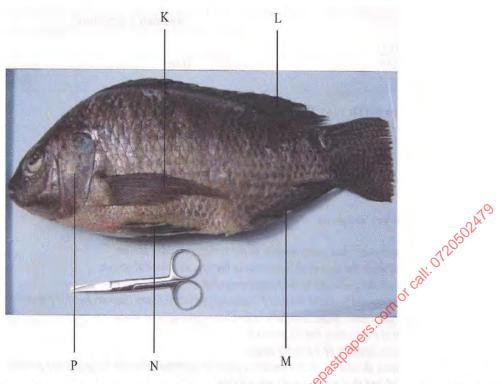
231/3

BIOLOGY PRACTICAL

Paper 3

Time: 13/4 Hours

1. Below is a photograph of a fish. Examine it and answer the questions that follow.



- a) List three observable features used to identify the class to which the organism shown on the photograph belongs [3mks]
- b) The actual length of the pair of scissors next to the fish is 13 cm. Using this information, calculate the actual length of the fish. (3 marks)
- c) Name all the observable structures that prevent the following movements of fish during swimming.

(2marks)

- i) Yawing
- ii) Pitching......
- d) The photograph below shows structures visible after removing the part labeled P. The inset labeled figure 2 (a) is a magnified view of one of the structures.



) Name the part labeled R, S and T

(3 marks)

ii) Explain how each of the parts named in (d) (i) above is adapted to its function.

(3 marks

You are provided with a visking tubing and

Solution A

Solution B

Solution C

Solution D

Label solution A as Benedict's solution using one of the blank labels provided.

Label solution B as **Iodine** solution using one of the blank labels provided. Measure 20 ml of solution D and pour into the boiling tube provided.

Reserve the rest of solution D for use in the next procedure.

Carefully open the visking tubing provided.

Tightly tie one end of the visking tubing with one of the pieces of thread.

Measure 10 ml of solution C and pour into the visking tubing.

Tightly tie the second end of the visking tubing.

Reserve the rest of solution C for use in the next procedure.

Ensure there is no leakage at both ends.

Rinse the visking tubing with the tap water provided.

Completely immerse the visking tubing into the boiling tube containing solution D and leave for 30 minutes.

Using the reagents provided, test for food substances in solution C and D (using portions of solution C and D reserved earlier.)

Record your work in the following table.

[8mks]

SOLUTION	FOOD SUBSTANCE	PROCEDURE	OBSERVATION	CONCLUSION
			0/	
C			COLL	
			ors.	
)			029	

ii) After 30 minutes carefully remove the visking tubing from inside the boiling tube.

Using the same reagents, test solution D in the boiling tube for food substances.

Record your work in the following table.

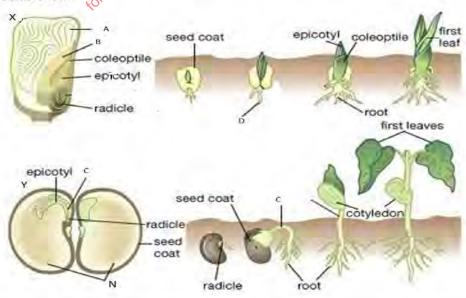
[2mks]

SOLUTION	FOOD SUBSTANCE	PROCEDURE	OBSERVATION	CONCLUSION
D,in the boiling tube	ole vi	5		

- iii) Account for the results obtained after carrying out the food tests on solution D before and after immersing the visking tubing containing solution C and leaving it for 30 minutes. [2mks]
- iv) Name the physiological process being investigated in the procedure above.

[1mk]

The diagram below illustrates photographs of plants undergoing a certain process. Study them carefully and answer the
questions that follow.



a)	i) Name the process illustrated on the photograph.	[1mk]
	ii) State two differences in the way the process occurs as illustrated in X and in Y.	[2mks]
b)	i) State two roles of part C in the process illustrated above.	[2mks]
	ii) State two external factors that are necessary for the process above to take place.	[2mks]
c)	Name the parts labelled B and give its function	
	Name:	[1mk]
	Function	[1mk]

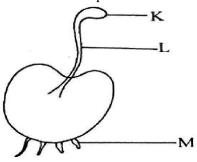
d) Using observable features only, name the classes to which the specimen X and Y belong, giving **one** reason in each case.

SPECIMEN	CLASS	REASONS
X		
Y		

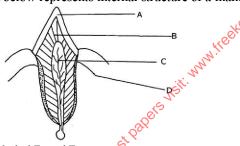
Rot more tree past pagers visit. Municipal desperance tree past pagers and the pagers of the pagers

NANDI EAST, NANDI SOUTH & TINDERET SUB-COUNTIES JOINT EVALUATION 2016 231/1 **BIOLOGY** PAPER 1 JULY / AUGUST 2016 **TIME: 2 HOURS** Name the cell organelles responsible for: (i) Protein synthesis. (1mk) (ii) Destroying worn-out organelles. (1mk) (a) What is test cross? (1mk) (b) State the function of the part marked B. (1mk) (a) Explain why tracheids are not efficient in transporting water up the plant. (1mk) (b) What is the advantage of xvlem vessels being dead? (1mk) (a) What is meant by the term binomial nomenclature? (1mk) (b) A dog is called *Canis familiairis*. Name the taxonomic unit represented by canis. (1mk) Define the following terms in relation to a cell. (3mks)(a) Isotonic solution: (b) Hypotonic solution: (c) Hypertonic solution: (a) Name the site of gaseous exchange in mammals. (1mk) (b) State **one** characteristics of the site named in (a) above. (1mk) What is the meaning of the following terms? (2mks)(a) Autecology: (b) Synecology: (a) What is eye accommodation? (1mk) (b) Explain how the Iris muscle controls the size of pupil when exposed to bright light. (2mks) (a) What is seed dormancy? (1mk) (b) Name a growth inhibitor in seeds. (1mk)(c) Differentiate between hypogeal and epigeal germination in seeds. (2mks) 10. The following is an equation representing a type of respiration. $C_6H_{12}O_6$ $2C_3H_6O_3 + Energy$ (a) Identify the type of respiration. (1mk) (b) Suggest one industrial application of the process named in (a) above. (1mk) 11. Some form one students wanted to collect the following animals for study in the laboratory. State the suitable apparatus they should use. (i) Flying insects. (1mk) (ii) Crawling stinging insects. (1mk) (iii) Small animals from tree barks. (1mk) 12. (a) Distinguish between homologous and analogous structures in evolution. (2mks)(b) Give **one** limitation of fossil records as evidence for organic revolution. (1mk) 13. The chemical equation below represents a physiological process that takes place in living organisms. Process R $C_6H_{12}O_6 + C_6H_{12}O_6$ $C_{12}H_{22}O_{11} +$ Name: (2mks) The process R: (i) Substance Q: (ii) 14. The diagram below represents a bone obtained from the hind limb of a goat. Identify the bone. (1mk) (b) Name the type of joint formed at the part labelled T. (1mk) 15. Name **two** processes by which flowering plants excrete waste products. (2mks) 16. (a) State why the placenta is considered as an endocrine gland. (1mk) (b) Describe how the embryo in human is protected during pregnancy. (2mks)

17. Study the diagram and answer the questions that follow.



	(a) State the division the organism belongs.	(1mk)
	(b) Name the part labelled K.	(1mk) (1mk)
	(c) What is the function of the part labelled M?	(1mk)
18.	(a) Why is blood group AB described as a universal recipient?	(2mks)
	(b) Suggest why blood does not clot in blood vessels of a healthy person.	(1mk)
19.	Explain how the following adaptations minimize the rate of transpiration.	
	(a) Sunken stomata	(1mk)
	(b) Leaf drooping	(1mk)
	 (c) State <u>two</u> environmental factors that influence the rate of transpiration. (a) Name the causative agent for the following diseases:- (i) Amoebic dysentery (ii) Schistosomiasis 	(2mks)
20.	(a) Name the causative agent for the following diseases:-	
	(i) Amoebic dysentery	(1mk)
	(ii) Schistosomiasis	(1mk)
	(b) Explain why primary productivity in aquatic environment reduce with increase in depth.	(2mks)
	(c) Define the term eutrophication.	(1mk)
21.	State <u>two</u> biological importance of tropisms in plants.	(2mks)
22.	(a) Name <u>two</u> disorders in man that occur through gene substitution.	(2mks)
	(b) Give <u>one</u> advantage of polyploidy.	(1mk)
23.	 (c) Define the term eutrophication. State two biological importance of tropisms in plants. (a) Name two disorders in man that occur through gene substitution. (b) Give one advantage of polyploidy. (a) Name the source of hydrochloric acid in the mammalian heart. 	(1mk)
	(b) The diagram below represents internal structure of a mammalian tooth.	(2mks)
	^	



Name the parts labeled B and D.

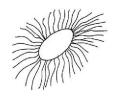
24. An accident victim was found to pass large volumes of diluteurine.

(a) What part of brain was injured?

(1mk)

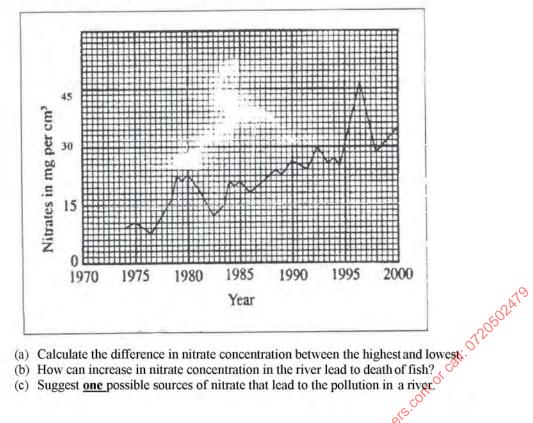
(b) Explain how the injury of the part of the part mentioned in 25(a) above brought about the release of large volume of urine. (2mks)

urine.
25. The diagram below shows a seed of a certain plant.



	(a) Name the likely agent of dispersal.	(1mk)
	(b) Give a reason for your answer.	(1mk)
26.	Explain how the following tissues are adapted to provide mechanical support in plants.	
	(a) Collenchyma	(1mk)
	(b) Sclerenchyma	(1mk)
27.	(a) Define active transport.	(2mks)
	(b) State <u>two</u> roles of active transport in animals.	(2mks)
28.	(a) Lokori school Biology student used a microscope with x40 objective lens and x5 eye piece lens which	had 2mm radius.
	Calculate the area of the filed of view in micrometers.	(2mks)
	(b) What is the average size of the cell in micrometers?	(2mks)

29. Use the graph below to answer the questions that follow.



(1mk)

(2mks)

(1mk)

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NANDI EAST, NANDI SOUTH & TINDERET SUB-COUNTIES JOINT EVALUATION 2016

231/2

BIOLOGY

PAPER 2

(THEORY)

JULY / AUGUST 2016

TIME: 2 HOURS

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided.

- 1. A man with normal skin colour got married to a woman with normal skin colour. They gave birth to three children; one of them an albino.
- (i) Identify the probable genotype of the parents using letter (A) for normal gene and (a) for defective gene. (2mks) Man:

Woman:

(ii) Using a genetic cross; show the genotypes of the offspring.

(3mks)

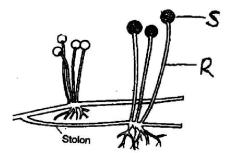
(iii) Give the phenotypic ratio of the offsprings.

(1mk)

(iv) Give two examples of sex linked genes.

(2mks)

2. Study the diagram below of an organism and answer the questions below it.



(i) Name the part labeled R on the diagram.(ii) State the function of part S.

(1mk)

(i) Identify the kingdom to which it belongs.

(1mk) (1mk)

(ii) Give a reason for your answer in (a) (i) above.

(1mk)

(ii) (i) State the asexual mode of reproduction of the organism shown in the diagram.

(1mk)

(ii) Identify <u>two</u> other asexual modes of reproduction among lower organisms.

(2mks)

(iv) Name the structure in which male gametes are produced in division Bryophyta.

- (1mk)
- 3. The equation below represents a certain physiological process. Study it and answer the questions below.

The equation below represents a certain physiological process. Study it and answer the questions of

 $C_{18}H_{36}O_2 + 26O_2 + 18CO_2 + 18H_2O + ATP$

(1mk)

(i) Name the above process.(ii) Give two reasons for question (i) above.

(2mks)

(iii) Calculate the respiratory quotient of the compound that was as the substrate.

(2mks

(iv) Identify the substrate being respired in the above equation.

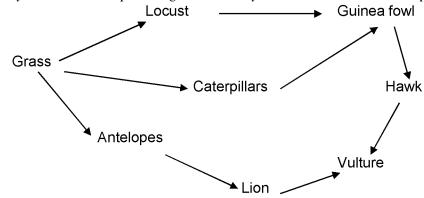
(1mk)

(v) State <u>one</u> importance of this process to living organisms.

(1mk)

(vi) Name the organelle where the above process takes place in animal cells.

- (1mk)
- 4. (a) A wild beast in Maasai Mara National Park were found to be infested with a lot of ticks. State the trophic level occupied by the following organisms. (2mks)
 - a. Wild beast:
 - b Ticks
 - (b) Study the food below representing a certain ecosystem and use it to answer the questions that follow.



- (i) Write down a food chain in which the vulture is a tertiary consumer.
- (ii) What would be the effect of introducing gazelles and termites into the ecosystem?

(1mk) (1mk)

- (c) During an ecology, students collected and marked 40 ants and then released them. After 2 days, the students captured another 100 ants, 40 of which had been marked previously.
 - (i) How many ants were there in the compound? Show your working.

(2mks)

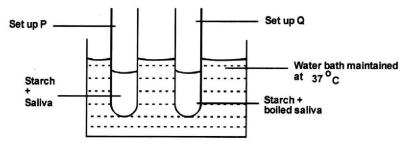
(ii) Give two assumptions of this method in sampling animal population.

(2mks)

(1mk)

(1mk)

5. In an experiment to investigate an aspect of digestion, two test tubes P and Q were set as shown in the diagram below.



The test tubes were left in the water bath for 30 minutes. The content of each test tube was then tested for starch.

- (a) (i) Name the reagent that was used to test for starch. (1mk)
 - (ii) What was the aim of the experiment? (1mk)
- (b) What were the expected results in tube P and Q? (2mks)
- (c) Account for the results you have given in (b) in test tube P and Q. (2mks)
- (d) (i) Why was the set-up left at 37°C?
 - (ii) In what form is starch stored in animal cells?

SECTION B

Answer question 6 (Compulsory) and either question 7 or 8 from this section.

6. An experiment was carried out to determine the growth rates of bamboo and a variety of maize plants in two adjacent plots. The average height and average dry weight of plants from the two populations were determined over a period of twenty weeks. The data is as shown in the table below.

	Bamb		M	aize
Age in weeks	Average height (Metres)	Average weight	Average height	Average weight
		(Grams)	(Metres)	(Grams)
2	1.3	52	0.3	20
4	4.0	182	0.5	29
8	8.2	443	0.8	57
8	12.1	682	1.2	78
10	13.9	801	1.7	172
12	14.1	957	1.9	420
14	14.3	1025	2.1	704
16	14.4.0	1062	2.1	895
18	14.6	1127	2.1	926
20	3 4.6	1229	2.1	908

(a) Between which two weeks did the greatest increase in weight occur in:

(2mks)

- (i) Bamboo plants:
- (ii) Maize plants:
- (b) (i) Which of the two types of plants had a higher productivity by the end of the experiment?
- (1mk)

(ii) Give a reason for your answer in (b) (i) above.

- (1mk)
- (c) Between weeks 14 and 18, the average height of the maize plants remained constant while average dry weight increased. Explain this observation. (3mks)
- (d) Suggest how the change in the average dry weight bamboo and maize plants would have been at week 22 if the experiment was continued. (2mks)
- (e) Why was it appropriate for this experiment to use:
 - (i) Dry weight instead of fresh weight.

(2mks) (1mk)

- Describe how the average height and weight of the plants were determined in this experiment.
- (i) Average height.

(ii) Weight and height.

(2mks)

(ii) Average dry weight.(g) Give a reason why secondary thickening does not occur in bamboo and maize plants.

(3mks) (1mk)

(h) Give two characteristics of meristematic cells.

(2mks)

7. (a) Describe **three** adaptations of a respiratory surface.

(6mks)

(b) Describe the mechanism of gaseous exchange in a mammal.

(14mks)

. (a) Describe the mechanism of hearing in man.

(16mks)

(b) State four differences between endocrine and hervous systems.

(4mks)

NANDI EAST, NANDI SOUTH & TINDERET SUB-COUNTIES JOINT EVALUATION 2016

231/3 **BIOLOGY PRACTICAL JULY / AUGUST 2016**

CONFIDENTIAL

Reagents

Specimen Q – Tradescantia stem with leaves. Solution S1 - Distilled water

Solution S2 - Saturated salt solution

Each student should be provided with:

- Scalpel
- Ruler (15cm long)
- 8cm3 of solution S1 in a boiling tube.
- 8cm3 of solution S2 in a boiling tube.
- Stickers
- Means of timing

Specimen Q – Tradescantia stem with leaves.

NANDI EAST, NANDI SOUTH & TINDERET SUB-COUNTIES JOINT EVALUATION 2016

231/3

BIOLOGY

PAPER 3

(PRACTICAL)

JULY / AUGUST 2016 TIME: 13/4 HOURS

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided.

- You are provided with a specimen labeled Q. Cut the stem to obtain a 3cm stem piece. Then cut the 3cm stem piece longitudinally to obtain four quarters of equal sizes. Put one piece in solution labeled S, and the other piece in solution S₂. Discard the remaining two pieces.
- (i) Draw and label the appearances of the stem pieces put in:

(i) Solution S_1

(ii) Solution S_2 (2mks)

(ii) Account for the appearances in (a) above.

(i) Appearance in S_1 (3mks)

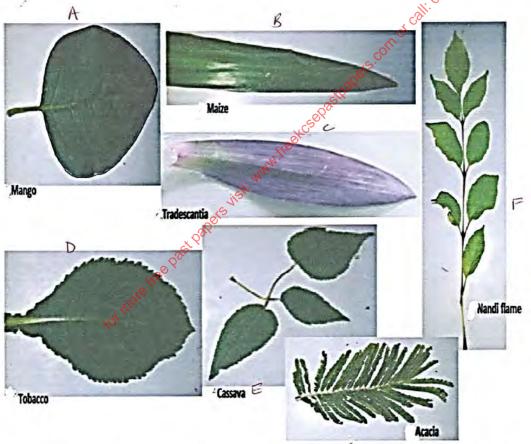
(ii) Appearance S₂ (3mks) Explain what would happen if a boiled piece was put in solution S₁ (2mks)

(iii) Explain what would happen if a boiled piece was put in solution S₁(iv) Give one role of the above physiological process in plants.

(1mk)

(2mks)

You are provided with plant specimens below.



(i) Construct a dichotomous key using the features given below in order. (10mks)

- (i) Leaf type
- (ii) Leaf venation
- (iii) Leaf colour
- (iv) Leaf margin
- (v) Number of leaflets
- (vi) Attachment of leaflets

2) (a)

				Biology p1, p28
66.00				
the second secon			***************************************	
6) (a)				
(b).			a	
(ii) Usi	ng the steps follow	ved, identify the plant	specimens provided.	(3mks)
	Specimen	Steps followed	Identity	
	В	TI FINAL COLUMN		
	Е		1	
	G			
3. (a)	The figure below	shows feet of various	birds. Study the diagram and answer the	questions that follow.
			to sale	
		12	是 看	
		And a		
	€	if y		
	4	16	bird C bird C bird E by Bird E. n for your answer.	
	U	bird A bird	bird C	10
		The Sec. 10.		Ok.
		The same of the sa		
		C. All		011
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	40	المالمة	hird E	
(a) C:	ing a rooson state	the type of food eater	by Died F	(2mks)
	od eaten:	the type of food eater	by Bild E.	(ZIIIKS)
	ason:		ols and a second	
		ird D and give a reaso	n for your answer	(2mks)
	bitat:	na D ana give a reaso	in for your answer.	(Zinks)
	ison:		C.S. C.	
		ructures shown by the	feet above and give a reason for your ans	swer. (2mks)
	oe of structure:	restances on o many the	4.	(emay
	ison:		NAN	
		ution shown by the str	ictures	(1mk)
			hale paddle and figure 3 an insect wing.	Study the diagrams and answer the
que	estions that follow.		ers	
	Figure 1	60	Figure 2	
	H	E 65	A	
			F-S	
			1000	
		THOIS I	(4)	
			The state of the s	
			(1)	
	Fig	ure 3		
			G	
		1		
		1-2		
(i) In 1	figure I, identify be	ones: H and F		
		it formed by bones Ha	nd E	(lmk)
			and the type of holution.	(2mks)
	uctures:	Lactures shown above	and the type of holdholl.	(2111K3)
	oe of holution:			
		uctures? Give one exa	mple in man.	(2mks)
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MAKUENI COUNTY CLUSTER PREPARATORY EXAMINATION 2016

231/2 BIOLOGY PAPER 2: THEORY

MARKING SCHEME

- 1. a) A cell membrane / plasmalemma/plasma membrane;
 - B cytoplasm;
 - C nucleolus;
 - D nuclear membrane;
 - b) Drawing magnification = _____

= 7.5 micrometer

c) Animalia;

Reason

Absence of cell wall / irregular shape / centralized nucleus/ absence of chloroplast;

- 2. (a) to investigate the effect of heat on enzyme ptyalin
 - (b) A: Iodine solution turned blue- black;
 - B: brown colour of iodine remained;
 - (c) A: boiling denatured enzyme ptyalin, hence no enzyme to hydrolyse starch to maltose;
 - B: Enzyme ptyalin hydrolysed starch to maltose; hence iodine test for starchis negative;
 - (d) Optimum temperature for enzyme action// normal human body temperature for enzyme action;
 - (e) Enzymes are denatured at temperatures beyond optimum;
- 3. a) pteridophyta
 - b) Q Adventitious roots; rej root alone
 - R Rhizomes;
 - S Sori/sorus;
 - (c) Function
 - Q Anchorage / absorption of water;
 - S Reproduction;
 - (d) Gametophyte;

Sporophyte;

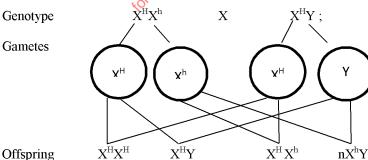
4. a) i)



ii) Deoxyribose sugar/ 5 carbon sugar;

Phosphate molecule;

b)



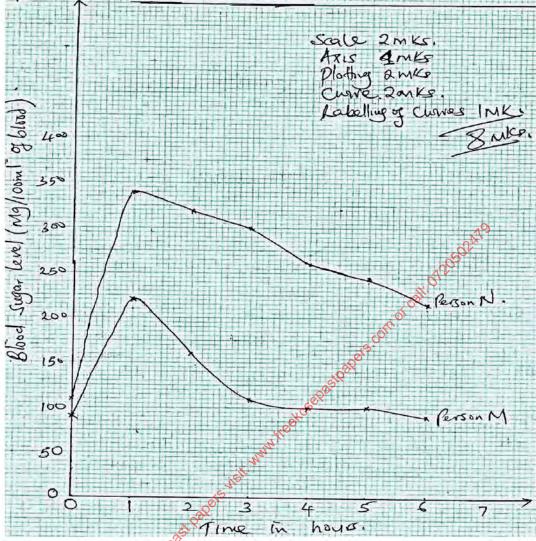
- Onspring
- c) Down"s syndrome/turners syndrome/klinefelters syndrome;
 - NB For gametes to score the circle should be complete.

For crossing lines to score – the lines should not enter the circle or be hanging. The lines should not cross before touching the circle

- 5. a) primary consumer;
 - b) I Predation / feeding;
 - II Decomposition / decay;
 - III Absorption;

- c) (Saprophytic) bacteria / fungi;
- d) Primary consumer will increase in number; leading to over grazing; hence number of producers will reduce;

6. a) BLOOD SUGAR LEVEL AGAINST TIME



- b) i) Blood sugar level rises rapidly in the first hour; due to absorption of glucose from ileum into blood stream;
 - ii) Blood sugar level then starts declining as the person secrets insulin hormone (from the pancreas); which stimulates the liver cells to convert excess glucose into glycogen; (to lower blood glucose level)
- i) failure of the pancrease to secrete sufficient hormone insulin; which acts on the liver cells to lower the blood sugar level when it rises above normal;
 - ii) Regular intravenous injection of insulin; (so as to lower the blood sugar level);
- d) i) The pancreas secretes glucagon hormone; which stimulates the liver cells to raise blood sugar level by reducing oxidation of glucose/stimulates the conversion of stored glycogen to glucose.
 - There would be no secretion of the hormone insulin; hence the blood sugar level would rise far above normal resulting into diabetes mellitus;
 - iii) Diabetes mellitus is a kidney disorder due to insufficient or no secretion of insulin by the pancreas, leading to high blood sugar level. (Hence presence of glucose in urine);
 - Diabetes insipidus kidney disorder due to failure of the pituitary gland to secrete enough antidiuretic hormone; hence little or no water re absorption in the kidney tubules; (Mark as a whole)
- 7. Water exists as a thin film in the soil between soil particles; the concentration of cell sap is greater than that of the surrounding solution in the soil; thus drawing water molecules across the cell wall and membrane into the root hair cells; by osmosis; water drawn into the root hair cell dilutes the cell sap/ makes it less concentrated than that in the adjacent cell into the cortex cell; water then moves into the cortex cell; by osmosis; upto the endodermis where it passes through by active transport; then into the root xylem (xylem vessels of the root); the root xylem vessels conduct the water up to xylem of stem; then into the xylem of the leaves;

Water rises up the stem by root pressure (in the xylem vessels); capillarity; cohesion and adhesive forces; makes water molecules move as a continuous uninterrupted column in the xylem vessels up to the leaves;

As water vaporizes from the spongy mesophyll cell their cell sap becomes more concentrated than adjacent cells; thus this increases the osmotic pressure of the spongy mesophyll cells; as a result water flows into the spongy mesophyll cells from the surrounding cells; which in turn take in water from the xylem vessels in the leaf veins; this creates a pull// suction force // transpiration pull; that pull the stream of water from the xylem vessels in the stem and roots;

The transpiration pull maintains a continuous column of water from the roots to the leaves;

(21/20 marks)

8. a) Accommodation of distant object (far vision)

The ciliary muscles relax; the suspensory ligaments contract and pulled tight; the lens then becomes (thinner); light from distant object is less refracted the focused on the fovea; and then interpreted in the brain;

Accommodation of a close object (near vision)

The ciliary muscle contract; the suspensory ligaments relax; the lens then become thicker (more spherical); light from close object is greatly refracted and focused on the fovea; and then interpreted in the brain;

b) Light enters the eye through the pupil; the radial and circular muscles in the iris control the size of the pupil, depending upon light intensity; the muscles work antagonistically.

In bright light (high light intensity); the amount of light entering the eye should be low; hence the pupil should be narrow; radial muscles of the iris relax; the circular muscles contract; the pupils becomes smaller; while the iris enlarges thus less light enters the eye;

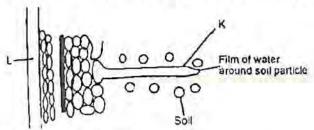
In dim light/ low light intensity; radial muscles in the iris contract; the inner circular muscles relax; the iris becomes smaller while pupil enlarges more light enters to the eye;

In dim light/ low light intensity; radial muscles in the iris contract; the inner circular muscles relax; the iris becomes smaller while pupil enlarges more light enters to the eye;

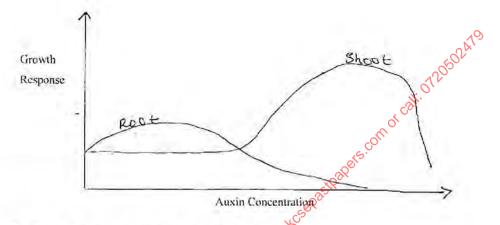
In dim light/ low light intensity; radial muscles in the iris contract; the inner circular muscles relax; the iris becomes smaller while pupil enlarges more light enters to the eye;

(3 marks)

15. The diagram below represents the pathway of water from soil into the plant.



a. Name the structures labeled K and L
b. Name the process by which mineral salts enter into the plant
16. a) How is support attained in herbaceous plants?
b) Name **two** tissues which are thickened with lignin.
17. Why are green plants referred to as primary producers?
18. State **two** ways in which human body is naturally protected against harmful bacteria.
19. The diagram below shows the difference in growth response to varying hormone concentration by foot and shoot

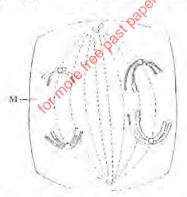


What is the effect of increasing auxin concentration on:

i) Roots (1 mark)
ii) Shoot (1 mark)

20. State three structural differences between biceps muscles and muscles of the gut.

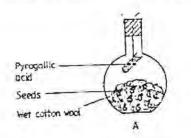
21. The diagram below represents a stage during cell division

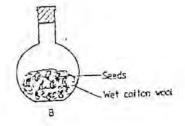


a)	i) Identify the stage of cell division	(1 mark)
	ii) Give two reasons for your answer in a) i) above	(2 marks)
b)	Name the structure labeled M	(1 mark)
22. Sta	ate three differences between plant cell and animal cell	(3 marks)
23. Sta	ate one function of revolving nose piece in light microscope	(1 mark)
24. Co	onstruct a step in a dichotomous key using two animals one with two pairs of legs and the other with four p	pairs of legs.
		(2 marks)
25. Ex	plain how the following factors determine the daily energy requirement inhuman:	
a)	Age	(1 mark)
b)	Occupation	(1 mark)
c)	Sex	(1 mark)
26. Na	une a method that could be used to estimate the population size of the following organisms	
i)	Fish in a pond	(1 mark)

(1 mark)

27. A student set up an experiment as shown in the diagrams below





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The set-up was at room temperature for a week

What was the aim of the experiment (1 mark)

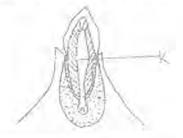
What would be the expected results at the end of the experiment? (2 marks) b)

28. Name fins in a bony fish which perform the following functions:

Changing direction (1 mark)

ii) Control pitching (1 mark)

29. The diagram below represents a section through a human tooth



Name the type of tooth shown.

Give a reason for your answer in (a) above. b)

State the functions of the structures found in the part labeled K.

State one way in which a red blood cell differs from other animal cells.

b) A patient whose blood group is A died shortly after receiving blood from a person of blood group B. Explain the possible cause of the death of the patient.

31. Explain how dropping of leaves on a hot sunny day is advantageous to plant.

(1 mark) (1 mark)

(2 marks)

(1 mark)

(2 marks)

(2 marks)

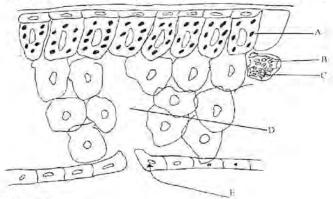
LONDIANI SUB-COUNTY JOINT EXAMINATION BIOLOGY

231/2

PAPER 2

Kenya Certificate of Secondary Education (K.C.S.E)

The following diagram represents the internal structure of a leaf. Study it and answer the questions that follow.



Name the parts marked A and E

(2 marks)

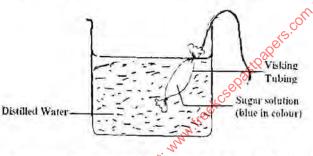
State the roles of parts marked B and C in plant nutrition b.

(2 marks)

Briefly describe the process of gaseous exchange between part marked D and the cells during the day C.

(4 marks)

In an experiment, a visking tubing was half filled with concentrated sugar solution containing methylene blue dye. Both ends were tied well to prevent leakage. It was then rinsed with distilled water and immersed in a beaker containing distilled water. The set-up is shown below. After 6 hours the water in the beaker turned blue, and the visking tubing was swollen with more solution.



Explain why the visking tubing was swollen with the solution at the end of the experiment

(3 marks)

Name the process through which the water in the beaker turned blue. h Distinguish between diffusion and active transport in a human body C.

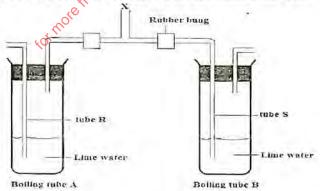
(1 mark) (2 marks)

State two roles of active transport in the human body.

d.

(2 marks)

3. The apparatus whose diagram is given below can be used to demonstrate results of a physiological process that occurs in a mammal. To use the apparatus, the experiment places his mouth at the point marked X and breaths in and out gently.



State the observations in the boiling tube when the experimenter a.

i) Breaths in:

> Boiling tube, A (2 mark) Boiling tube, B (1 mark)

Breaths out: ii)

> Boiling tube, A (1 mark)

> Boiling tube, B (1 mark)

b. What conclusions can you draw from the results of this experiment (2 marks)

What is the purpose of the boiling tube A? C.

(1 mark)

A cross between a red flowered plant and while flowered plant produces plants with pink flowers. Using letter R to represent 4. the gene for red colour and W for white colour,

What were the parental genotypes? a.

(1 mark)

Work out a cross between F1 plants. b.

(4 marks)

Give the phenotype ratio of F2 plants

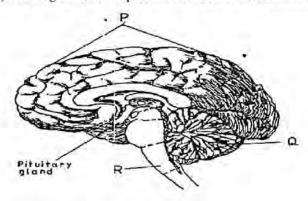
(1 mark)

Genotypic ratio of F2 plants

(1 mark) (I mark)

Name the characteristic in humans which is controlled by multiple alleles

5. a) The diagram below represents a section of the human brain.



Name the structures labeled P and R

(2 marks)

State two functions of the part labeled Q.

(2 marks)

Name two reproductive hormones secreted by the pituitary gland in women

ii) State one function of each of the hormones named in (b) (i) above.

(2 marks) (2 marks)

SECTION B

Answer question 6 (compulsory) and either questions 7 or 8 in the spaces provided after question 8.

You have been provided with the data below on the growth of price population. The population starts with two sexually mature mice, a male and a female. Every time they reproduce they reproduce in litter of six (3 males and 3 females) at 7 weeks intervals. Assume that they take 14 weeks to sexually mature and produce. They only die of old age when they are 3

The following table shows population growth and litter production.

Time interval in weeks	9	7	14	21	28	35	42	49
Mice population	2	8	14	28	62	104	146	260
Litter population	0	6	6	24	24	42	42	114

(8 marks)

Using the same axis draw graphs of population of mice and litter against time. i) How many times has the first ditter of mice reproduced?

(1 mark)

ii) How many times has the third litter of mice reproduced?

(1 mark)

State four factors that may have affected the population growth of mice.

(4 mark)

Explain the shape of the litter curve.

(4 marks)

How many pairs of mice reproduced between 14-21st weeks and 42-49 weeks?

(2 marks)

Between 14-21st weeks

Between 42-49 weeks

Describe how excretion takes place in the

Mammalian kidney i)

7.

8.

(10 marks)

ii) Green plants Explain how structural features in terrestrial plants affect their rate of transpiration a)

(10 marks)

(14 marks)

Explain why the xylem vessels are efficient for transport of water and mineral salts.

(6 marks)

LONDIANI SUB COUNTY JOINT EXAMINATION BIOLOGY

231/3

PAPER 3(PRACTICAL)

Kenya Certificate of Secondary Education (K.C.S.E)

- 1. You are provided with suspension M, test for the food substances in the suspension
- a) Using reagents provided test for the suspension. In the table below, record the food tested, your procedures, observations and conclusions.
 (12 marks)

FOOD SUBSTANCE

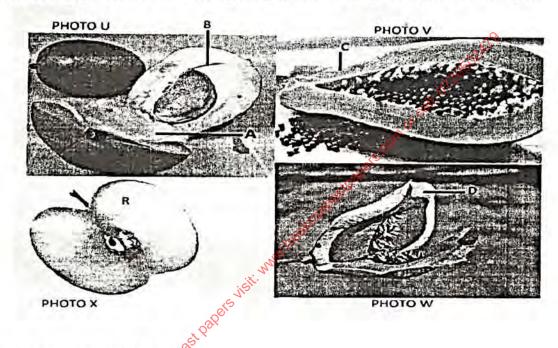
PROCEDURE

OBSERVATION

CONCLUSION

- b) Name two enzymes that may be required to digest suspension M in the alimentary canal in human beings
- (1 mark) (1 mark)

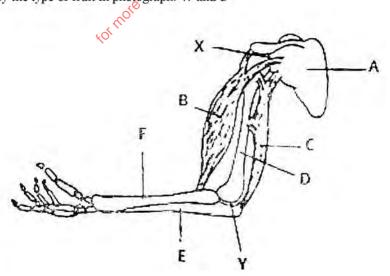
- c) Sate the role of HCL in the experiment
- 2. Study the photographs U, V, W and X showing fruit specimens that are open to expose the internal parts.



a) Name the parts labeled A,B,C and D

(4 marks)

b) Identify the type of fruit in photograph: W and U



KASSU JOINT EXAMINATION 231/1 BIOLOGY PAPER 1 **JUNE 2016** TIME: 2 HOURS State the function(s) of the following cell structures during cell division. (2mks) (i) Centriole (ii) Centromere (a) State the function of co-factors in cell metabolism. (lmk) (b) Give one example of a metabolic co-factor. (1mk) Industrial wastes may contain metabolic pollutants. State how such pollutants may indirectly reach and accumulate in the human body if the wastes were dumped into rivers. (3mks) In an investigation the pancreatic duct of a mammal was blocked. It was found that the blood sugar regulation remained normal while, food digestion was impaired. Explain these observations. (2mks) The diagram below represents a transverse section through a plant organ. (a) From which plant organ was the section obtained. (1mk) (b) Give two reasons for your answer in (a) above. (2mks) State two structural differences between ribonucleic acid(RNA) and deoxyribonucleic acid (DNA). (2mks) RNA (i) (ii) (a) Explain why glucose does not appear in uring a healthy person even though it is filtered in the Bowman's capsule of a mammal. (2mks) (b) In a certain person, glucose appeared in frine. State the disease the person was suffering from. (lmk) State the stage in cell division in which the following events occurs:-(i) Replication of the genetic material (1mk) (ii) Exchange of genetic material (1mk) In a blood test, a few drops of anti-B serum were added to two samples of blood. It was noted that agglutination occurred. What were the possible blood groups of the two blood samples? (2mks) Explain what would happen when a marine amoeba is transferred to a fresh water environment. (3mks) 11. A small amount of chemical M was put on one side of maize celeoptiles. After some days, it was noted that the celeoptiles curved away from the side to which the chemical was applied. (a) Suggest the possible identity of chemical substance M (lmk) (b) Explain how this chemical might have caused the celeoptiles to curve. (2mks) 12. Name the division of the Kingdom plantae with the following spore producing bodies. (2mks) (i) Sori (ii) Capsule 13. (a) Name two fins in a bony fish which perform the following functions:-Changing direction, control pitching. (2mks) (b) State the role of the swim bladder in a fish. (1mk) 14. (a) In which part of the spinal cord is the cell body of the motor neurone found. (1mk) (b) Below are two features which make a neurone a specialised cell. State their roles. (2mks) (i) Axon.

(ii) Dendrites. 15. (a) What is a natural selection?

> i) Testis ii) Uterus

(b) Distinguish between convergent and divergent evolution.

(a) Explain how the following parts of a mammalian reproductive system are adapted to their functions.

(b) Explain why removal of the ovary after four months of pregnancy does not terminate pregnancy.

(1mk)

(1mk)

(2mks)

(lmk)

- 17. Active yeast cells were added to a dilute sugar solution in a container. The mixture was kept in a warm room. After a few hours bubbles of gas were observed escaping from the mixture.
 - (a) Write an equation to represent the chemical reaction above.

(1mk

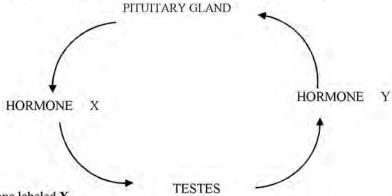
(b) What is the economic importance of this type of chemical reaction in industry?

(lmk)

18. What are the functions of the odontoid process found on the axis bone of the cervical vertebra?

(2mks)

The diagram below represents a simple endocrine feedback mechanism in a human male.



(a) Name the hormone labeled X

(lmk)

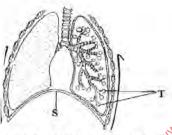
- State two differences that may be observed between a normal male and one who is incapable of producing hormone labeled Y (2mks)
- 20. (a) What is meant by double fertilization inflowering plants?

(2mks)

(b) State two advantages of cross pollination in aflowering plant.

(2mks)

21. The diagram below shows part of a mammalian respiratory system.



(a) Explain two ways in which the part labeled T is adapted to its functions.

(2mks)

(b) How does the part labeled S facilitate breathing in?

(2mks)

Define the term alleles.

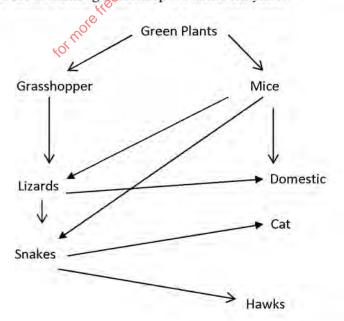
(lmk)

23. (a) Explain why the body temperature of a healthy human being must rise upto 39°C on humid day.

(2mks)

(b) In an experiment a piece of brain was removed from a rat. It was found that the rat had large fluctuations of body temperature. Suggest the part of the brain that had been removed. (1mk)

24. The chart below shows a feeding relationship in a certain ecosystem.



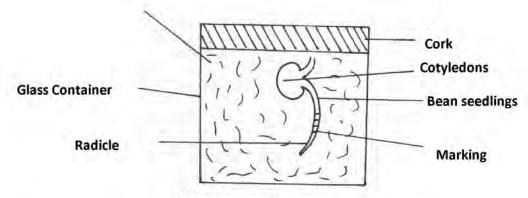
(a) Construct the food chains ending with a tertiary consumer in each case.

- (2mks)
- (b) Suggest three ways in which the ecosystem would be affected if there was prolonged drought.

(3mks)

25. A student set up an experiment as shown in the diagram below.

Cotton wool



4 700	CREAT BEAT	DOM: A	130
Δ.	THE	- I A	

	AT THE STAKE	
(a)	(i) What was being investigated in the experiment?	(1mk)
	(ii) Draw a diagram to indicate the expected results of the experiment after three days.	(1mk)
	(iii) Why was it necessary to have wet cotton wool in the container	(1mk)
	(b) What is the role of the following in a germinating seed.	
	(i) Oxygen	(lmk)
	(ii) Cotyledons	(1mk)
26.	Give a reason why it its only mutations in genes of gametes that influence evolution.	(1mk)
27.	A person was able to read a book clearly at arm"s length, but not at normal distance.	
	(a) State the eye defect the person suffered from.	(1mk)
	(b) Why was he unable to read the book clearly at normal distance.	(1mk)
	(a) How can the defect he corrected	(Imle)

(c) How can the defect be corrected. (1mk)

28 Some form three students took a germinating maize grain and placed it in a starch paste in a petri dish and put the Petri dish in a water bath maintained at 30°C. After 48 hours the starch paste was irrigated with iodine solution. The area around the maize grain changed to the colour of iodine solution while the rest turned blue –black.

(a) Account for the observation

(2mks)

(b) Why was the Petri dish put in a water bath maintained at 30°C?

(1mk)

29. State two functions of muscles found in the alignentary canal of mammals.

(2mks)

30. Explain two ways in which xylem vesseles are adapted to their function.

(2mks)

KASSU JET EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E.) 2016

231/2 **BIOLOGY** PAPER 2 **JUNE 2016**

TIME: 2 HOURS

SECTION A (40 MARKS)

Answer all the questions in this section in the spaces provided

- A couple has three children, the mother had blood group A and the father had blood group B while one of the children had blood group 0.
- What were the genotypes of the parents? (i)

(1mark)

Father Mother

(ii) What was the genotype of the child with blood group 0?

(1mark)

Work out using a punnet square the genotypes of the other children.

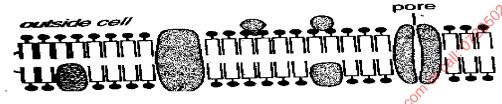
(4 marks) (1mark)

(c) Which child can receive blood from any member of the family?

(d) State the percentage of children who can donate blood to all blood groups.

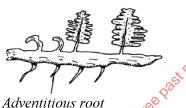
(1mark)

Below is a diagram of a structure found in Eukaryotic cells? Study it and answer the questions that follow



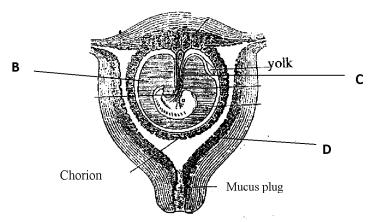
Identify the structure (1 mark) a) State two functions of the structure (2 marks) b)

- Name **one** organelle found in animal cells but absent in plantcells (1 mark) c)
 - ii) State one function of the organelle you have named in(c) above (1 mark) Briefly explain cell biology as an evidence of evolution (3 marks)
- d) Below is a diagram of a plant a form three student collected while carrying out an ecological study?

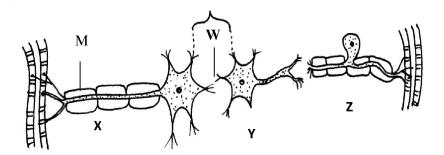


- With reasons identify the division into which the students classified the plant.
- (i) Name the structure that produces spores in this plant. (1mark) (ii) State two differences between the plant division above and that of the division spermatophyta. (2 marks) c) Give **two** distinguishing features of class *Amphibia* (2marks)
- The diagram below represents human foetus in a uterus.





		Biology p1, p2&p3
a)	Name the part labeled D.	(1 mark)
b)	i) Name the types of blood vessels found in the structure labeled C.	(2 marks)
	ii) State the differences in composition of blood found in the vessels named in (b) (i) above.	(2 marks)
	iii) State two importance of the fluid found in part B	(2 marks)
	iv) State the role of progesterone during pregnancy	(1 mark)
5.	The diagram below represents three types of neurons found in a mammalian body.	



(a) Name the neurons X, Y and Z

(3marks)

(b) Name the chemical substance responsible for the transmission of an impulse across the gap labelled W.

(1mark)

(c) State two functions of the part labelled M.

(2marks)

(d) In which part of the spinal cord is neurone Y located?

(1mark)

(e) Using arrows indicate on the diagrams the direction followed by nerve impulse leading to a response.

(1mark)

SECTION B (40MARKS)

Answer questions 6(compulsory) and either questions 7 or 8 in the spaces provided

6. During germination and growth of a cereal, the dry weight of endosperm, the embryo and total dry weight were determined at two – day intervals. The results are shown in the table below.

Time after	Dry weight of	Dry weight of embryo	Total dry weight (mg)
planting(days)	endosperm	(mg)	
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6 190	33	39

Using the same axes, draw graphs of dry weigh of endosperm, embryo and the total dry weight against time

b) What was the dry weight of the endosperm and embryo on the 5th day?

(2marks)

Endosperm

Embryo c) **Account** for:

i) Decrease in dry weight of endosperm from day 0 to 10

(2marks)

ii) Increase in dry weight of embryo from day 0 day 10

(2marks)

iii) Decrease in total dry weight from day 0 to day 8

(2marks)

State the role of the following in germination

(2marks)

i) Glucose

(2man.

i) Glucose

ii) Enzymes

e) How are the foliage leaves adapted to their function

(2 marks)

(a) **Describe** the role of hormones in blood sugar regulation

(10 marks)

(b) **Explain** how halophytes are adapted to their habitat

(10 marks)

8 (a) **Explain** the adaptations of thoracic, cervical and lumbar vertebrae to their functions

(12 marks)

(b) **Describe** the structural factors affecting transpiration

(8 marks)

KASSU

BIOLOGY PAPER 3

JUNE 2016

CONFINDENTIAL

Question 1

- 1. 4 test tubes per rack
- Solution R 1% starch solution 2.
- 3. Solution T - Distilled water
- 4. Solution H – 1 Molar HCl (aq)
- 15cm string 5.
- 8 cm long visking tubing 6.
- 7. Iodine solution
- 50 ml beaker

Question 2 and Question 3

Print photos on coloured printer.

KASSU JOINT EXAMINATION

Kenya Certificate of Secondary Education

231/3

BIOLOGY

PAPER 3

PRACTICAL

JUNE, 2016

13/4 HOURS

You are provided with Four Test-tubes label as A, B, C and D. You are required to prepare the contents of test tube A, B, C and D as follows.

To test tube A add 2cm³ of solution R provided and test using the provided reagent.

To test tube **B** add 2cm³ of solution **T** provided and test using the provided reagent.

(5 marks)

Test tube	Procedure	Observation	Conclusion
A		7.77	4100
В			'4,

(b) To test tube C and D, prepare them as follows:

To test tube C add 2cm³ of R and 2cm³ of solution H provided boil it and allow it to stand for 5 minutes.

To test tube **D** add 2cm³ of **R** and 2cm³ of solution **T** boil and allow it to stand for 30 minutes. For both **C** and **D** test using the provided reagents and tabulate your results below. (5 marks)

Test tube	Procedure	Observation	Conclusion
C	9	(C)	
D	noite		

- (c) To the provided visking tubing tie one end with the provided string and add solution R. Tie the remaining end and immerse it in a solution of iodine solution in a beaker (50ml). After 2 minutes remove it from the beaker and observe.
- What was your observation of the contents of the visking tubing at the end of experiment?

(1 mark) (3 marks)

(ii) Account for your results in (i) above.

Study the kidney diagrams below:

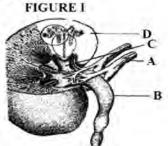
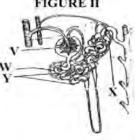


FIGURE II



Name the part labeled A in figure 1

Name the process that takes place in the parts labeled V.

(1mark)

(1 mark)

State two homeostatic functions of the organ in the diagram above.

(2marks)

Explain what will happen to the process of urine formation in absence of ADH. c)

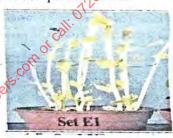
(3marks)

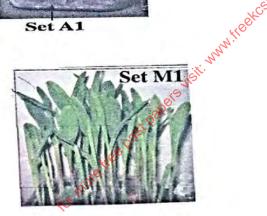
Below are photographs labeled **B** and **C** of organs obtained from different animals. The organs perform similar functions. Examine them and answer the questions that follow.



- (i) Name the parts labeled B1, B2 and B3 in photographs B (3marks)
- (ii) Identify the parts labeled K1, K2 and K3 in photograph C (3marks)
- Study the diagrams set A1, set E1, set M1 and set B carefully and answer the questions below









(a)	State the conditions under which each set up was grown.	(3mks)
	Set A ₁	
	Set E_1	
	Set B	
(b)	(i) Name the phenomenon exhibited by seedlings in set E ₁	(1mk)
	(ii) Give a reason why plants exhibit the phenomenon named in (b) (i) above	(1mk)
(c)	(i) Name the response exhibited by the seedlings in set B.	(1mk)
	(ii) Explain how the response named in (c) (i) above occurred	(2mks)
(d)	(i) State the type of germination exhibited by seedlings in set A ₁ and set M ₁ .	(2mks)
	Set A ₁	
	Set M ₁	
	(ii) Give a reason for your answer in (d) (i) above	(2mks)
	Set A ₁	
	Set M_1	
	(iii) State the mode of dispersal in set A above when mature.	(1 mk)
	(iv) Name the type of fruit formed by M1 on maturity.	(1 mk)

GATUNDU SUB-COUNTY

FORM FOUR 2016 EVALUATION EXAMINATIONS

231/1

BIOLOGY

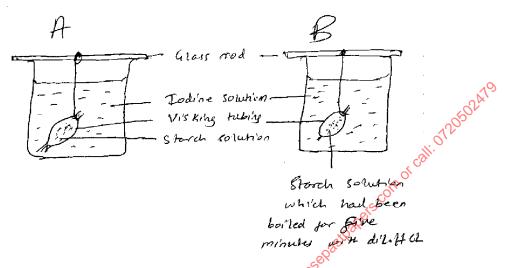
PAPER 1

(Theory)

JULY/AUGUST 2016

SECTION A:

- 1. A scientific space craft brought some material to earth from the outer space. Explain how one would establish if the material is living or non-living, 2mks
- 2. State two functions of golgi apparatus. 2mks
- 3. A student observed a row of 16 epidermal cells in a microscopic field that was 8mm in diameter. Calculate the average length of each cell in micrometers. 1mk
- 4. A group of students set up an experiment as shown below. The experimental set up were left for 20 minutes.



The observation after 20 minutes were as shown in thetable below.

Set up	Observations		
	Inside tubing	Outside tubing	
A	Blue black colour	Colour of liodine.	
В	Colour of iodine	Colour of iodine	

(a) State the process being demonstrated in this experiment.

(b) Explain the results in set up A. 3mks

5. In a tabulated form, distinguish between class gymnospermae and angiospermae. 2mks

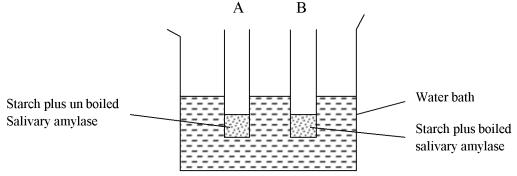
(a) Explain what happens when two species occupy the same habitat.

(b) State an adaptation of submerged aquatic plants to gaseous exchange.

7. (a) Explain why the number of predators in any ecosystem is less than the number of their prey. 2mks

(b) Define the term troplate level as used in ecology. (1mk)

In an experiment to investigate an aspect of digestion, two test tubes A and B were set up as shown in the diagram below.



The test tubes were left in the water bath maintained at 37oC for 30 minutes. The content of each test tube was then tested for storch

(a) What was the aim of the experiment?

(b) Why was the set up left at 37°C?

9. (a) State the function of co-factors in cell metabolism.

(b) Give an example of a metallic co-factor.

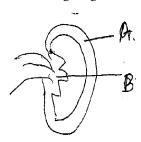
1mks

	Biology p1, p2&p3
(c) State one function of incisors in herbivores.	1mk
10. Explain how the following factors affect the rate of photosynthesis:-	2mks
(i) temperature.	
(ii) Concentration of carbon (iv) oxide.	
11. (a) What is metamorphosis?	1mk
(b) State one advantage of metamorphosis to the life of insects.	1mk
12. (a) Give any two characteristics of meristematic cells.	2mks
(b) Explain the function of epicotyl during seed germination.	1mk
13. (a) Explain how the following prevent self-pollination:-	2mks
(i) Dioecism.	
(ii) Self-sterility.	
(b) What is the role of pollen tube in plant fertilization? 1mk	
14 (a) The diploid number of chromosomes in a guinea fowl is 60. How many chromatids does it have at	the end of mitosis?
	1mk
(b) Suggest the advantages of internal fertilization and development.	2mks
(c) State three characteristics of fungi.	2mks
(d) Name the phylum whose members possess a notochord.	1mk
15. (a) State two causes of variation.	2mks
(b) Describe one difference between telophase II and	
	1mk
(ii) Telophase of mitosis.	1mk
16. The chemical equation below represents a reaction that occurs in cells.	
$2C_{57}H_{\odot}O_{6} + 145O_{2} \rightarrow 102CO_{2} + 98H_{2}O$	
(i) Calculate the respiratory quotient (RO)	2mks
(ii) Identify the substrate used in respiration	1mk
(iii) Name the compound that stores energy released during oxidation of glucoses	1mk
17. (i) Distinguish between convergent and divergent evolution.	2mks
 (i) Telophase I of meiosis. (ii) Telophase of mitosis. 16. The chemical equation below represents a reaction that occurs in cells. 2C₅₇H₉₈O₆ + 145O₂ → 102CO₂ + 98H₂O. (i) Calculate the respiratory quotient (RQ). (ii) Identify the substrate used in respiration. (iii) Name the compound that stores energy released during oxidation of glucoses. 17. (i) Distinguish between convergent and divergent evolution. (ii) Give one method by which the age of fossils can be determined. 18. The following statement represents a type of gene mutation. Intended message. Actual message (i) Eat the meat (ii) This is my team Heat the meat (iii) This is my team This is my tea. 	1mk
18. The following statement represents a type of gene mutation.	
Intended message Actual message	
(i) Eat the meat Heat the meat	
(ii) This is my team This is my tea.	
(ii) This is my team This is my tea.	
(a) Identify the type of gene mutation illustrated in I and Tabove.	
(b) Name two examples of chromosomal mutation that lead to change in chromosomal structure.	2mks
	ZIIKS
19. Give one factor that influences:- (a) Capillarity.	1mk
(b) Root pressure.	1mk
(c) State the role of companion cells during transport in phloem tissue.	1mk 1mk
20. Explain the meaning of the following terms:-	THIK
(a) Reception.	1mk
(a) Reception. (b) Co-ordination. 1mk	HIIK
21. Give the name of the following responses.	
(ii) coiling of a plant shoot round a supporting structure. 1mk	
22. The apparatus below illustrate breathing in a mammal.	
plug	
TT	
Rubber / plunger	

Capillary	Rubber baloon	syringe case	plunger
(a) Describe wha	t hannens if the rubh	er nlug is nulled in the direct	tion shown by the arrow

	(a)	Describe what happens if the rubber plug is pulled in the direction shown by the arrow.	lmk
	(b)	Give the parts of mammal represented by:-	
	(i)	Capillarity tube.	1mk
	(ii)	Rubber plug.	1mk
23	3. (a)	Name two bones that form the pectoral girdle.	2mks
	(b)	Name the cavity formed by the scapula that form a joint with the humerous.	1mk

24. Study the following diagram showing longitudinal section of akidney.



Name the parts labeled A and B. 2mks

- 25. Name the blood vessel that supplies blood to:-
 - (i) Heart muscles. 1mk
 - (ii) Kidney. 1mk

Explain why it is not advisable to sleep in a room with burning charcoal stove.

2mks

3mks

- 26. Name the part of the ear involved in:
 - (a) Balance.
 - (b) Amplification of sound waves.
 - (c) Reception of sound stimulus.

27. What is Homeostasis? Explain what happens to excess amino acids in the liver of humans.

1mk 3mks

28. State one use of each of the following excretory products of plants.

(i) Tannin.

1mk 1mk

(ii) Latex.

GATUNDU SUB-COUNTY FORM FOUR 2016 EVALUATION EXAMINATIONS

231/2

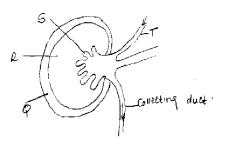
BIOLOGY

PAPER 2

(Theory)

JULY/AUGUST 2016

1. The diagram below is a longitudinal section of an organ in mammals.



- (a) Name the organ. 1mk
- (b) Identify the parts R and S
- (c) (i) State two differences in the structure above found in the desert rat and fish.

2mks

(ii) Account for the difference stated above. 2mks

(d) Name the gland associated with the secretion of aldosterone hormone.

1mk

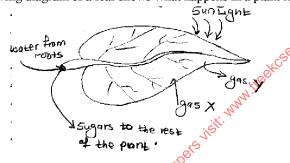
- 2. A family with four children, three were found to have normal skin pigmentation while one was albino. Using letter "A" to represent gene for normal skin pigmentation and "a" to represent the gene for albinism."
 - (a) What are the genotypes of the parents?

2mks

(b) Work out the genotypes of the normal pigmented children and the albino child.(c) What is the probability that the fifth child will be an albino.

5mks 1mk

3. The following diagram of a leaf shows what happens in a plant leaf during photosynthesis.



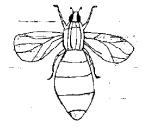
(a) State two ways in which leaves are adapted to absorb light.

2mks

- (b) Name the gases labeled x and y,
- (c) Name the tissues that transports:-

2mks

- (i) Water into the leaf.
- (ii) Sugar to other parts of the plant.
- (d) Explain why it is an advantage for the plant to store carbohydrates as starch rather than as sugars. 2mks
- 4. Study the diagram of the organism shown below then answer the questions that follow.



(a) State the phylum to which the organism belongs.

(b) With reasons state the class to which the organism belongs:-

1mk

Class
Reasons:

1mk 3mks

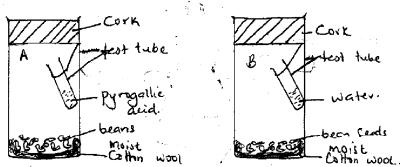
(c) Name two human diseases of which the organism is a vector.

2mks

(d) What type of metamorphosis does the organism show?

1mk

5. In an experiment a group of students set up the test tubes as shown below.



(a)	What was the aim of the experiment?	1mk
(b)	Why was the pyrogallic acid included in the gas jar A?	1mk
(c)	What results would you expect in each of the gas jar A and B at the end of the experiment?	2mks
(d)	State three artificial ways of breaking seed dormancy.	3mks
(e)	Name two hormones that bring about rapid cell division in plants.	2mks

SECTION B: 40mks

Answer question 6(compulsory) and either question 7 or 8 in the spaces provided after question 8

6. In an investigation, two persons A and B took the same amount of a meal rich in carbohydrates. Their blood sugar levels were immediately determined and thereafter at intervals. The results were as shown in the table below.

Time (minutes)	Glucose level in blood	d (mg/100cm ³)
	Person A	Person B
0	92	80
15	90	76
30	105	90 65.
40	116	105
60	140	162
80	138	210
120	100	202
135	96	194
160	90	180
180	90 2	162

	and the control of th	
(a)	On the grid provided, plot graphs of glucose level in blood against time on the same axis.	7mks
(b)		1mk
	(ii) What was the concentration of glucose in the blood of A and B at the 20 th minute?	2mks
(c)	(i) Account for the blood sugar level in person A and person B between O and 15.	2mks
	In man, the normal blood sugar level is about 90mg/100cm ³ of blood. Explain the change in the blood	ood sugar level in
	person A between 15 and 60 minutes.	4mks
(d)	(i) Suggest a possible reason for the high blood sugar level in person B.	2mks
	(ii) How can the high sugar level in person B be controlled?	1mk
(e)	Name the compound that stores energy released during oxidation of glucose.	1mk
7.	(a) Describe the way by which terrestrial plants are adapted to living in arid and semi-arid ecosystems	. 10mks
	(b) Explain how various human activities cause soil pollution.	10mks
8.	(a) Define:=	
	(i) Chemical evolution.	2mks
	(ii) Organic evolution.	2mks
	(iii) Giving examples give and account for any five pieces of evidence for organic evolution.	16mks

GATUNDU SUB-COUNTY FORM FOUR 2016 EVALUATION EXAMINATIONS

BIOLOGY

PAPER 3

2016 MOCK

CONFIDENTIAL

- 1. All the photographs should be colored
- 2. To make solution M mix thee egg yolks and 100g of sucrose with 500 mls of distilled water
- 3. Each student should have.....three test tubes

Access to DCPIP

Sodium bicarbonate

Benedicts solution

Dilute Hcl

Source of heat

Sodium hydroxide

Copper sulphate

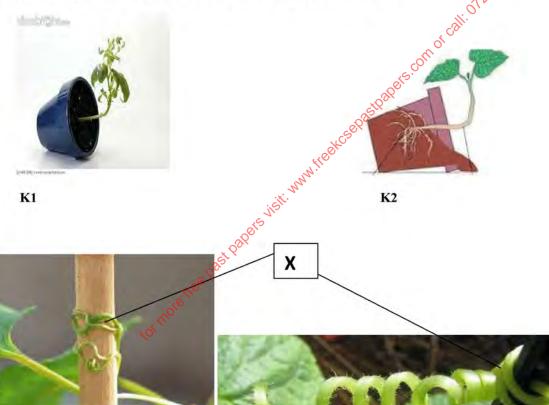
GATUNDU SUB COUNTY FORM 4 2016 EVALUATION EXAM

231/3

BIOLOGY

PRACTICAL

1. (i) Examine photograph k 1 and K2 then answer the questions that follow.



R1

R2

- (a) Name the response that is exhibited by the seedlings. 1mrk.
- (b) Explain how the response you have stated in (a) above occurs. 6mrks
- (c) What is the significance (survival value) of the response you have stated in (a) above.

1 mrk.

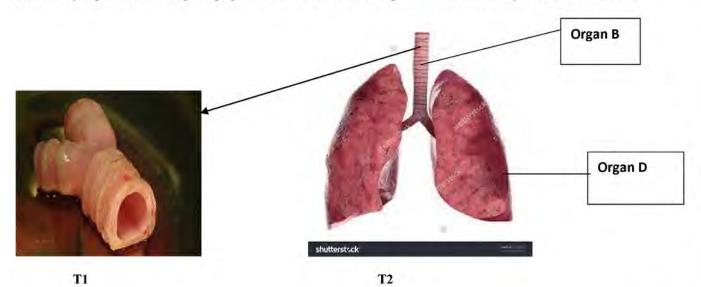
- (ii) Photographs R1 and R2 show a certain response in plants.
 - a) Name the response shown by plant X. 1 mrk
 - b) Explain how the response you have stated In (a) above occurs.

(3mks)

c) What is the biological significance of the response shown by X?

(3 mks)

2 (a). Identify organs B and D in photograph T2 and state the class of organism from which they were obtained (4mks)



(b) State the common function of the organs identified in (a) above.
(c) Name the parts of the body where B and D in photograph T2 are found
(d) List the adaptations of D to its functions
(e) Using observable features only, state how B is adapted to its function
(2mks)
3. You are provided with solution M and various reagents. Use them to carry out food tests.
(13mks)

EST	PROCEDURE	OBSERVATION	CONCLUSION
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KANGEMA/MATHIOYA FORM 4 JOINT EXAMINATION

BIOLOGY

PAPER 1

(Theory)

2.

7.

JULY/AUGUST 2016

Distinguish between taxonomy and taxon. (2 marks)

Name the organelle that performs the following functions in a cell.

a) Protein synthesis (1 mark)

Transport of cell secretions (1 mark) Explain why plant cells do not burst when immersed in distilled water. (2 marks)

3.

4. An experiment shown below was a set up to investigate a certain physiological process in plants.



What process was being investigated? (1 mark)

What effect will the following have on the observation made in (a) above?

Fanning the shoot (1 mark) i)

Removing all the leaves from the shoot. ii) (1 mark) iii) Placing the set up in the dark. (1 mark)

5. a) State the role of light in the process of photosynthesis. (1 mark)

b) Name one product of dark reaction in photosyntehsis. (1 mark)

State two mineral elements that are necessary in synthesis of chlorophyll. (2 marks) c)

50 black mice and 50 white mice were released into an area inhibited by a pair of owls. After four months 38 of the black mice and 9 of the white mice were recaptured.

How this observation would be explained. (2 marks)

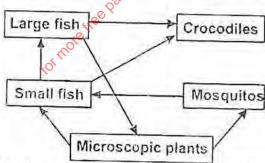
Name the theory of evolution that support the results in (a) above. (1mark)

Name two vestigial structures in man. (2 marks)

a) In an investigation, the pancreatic duct of a mammal was blocked, it was found that blood sugar regulation remains normal while food digestion was impaired. Explain these observations. (3 marks)

State two functions of bile juice in digestion. (2 marks)

Use the food web below to answer the questions that follows. 8.



Construct a food chain ending with crocodile as a quaternary consumer.

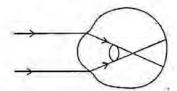
Name the organisms in the food web that has only one predator. (1mark)

Name the organism with

the highest biomass (1mark)

the lowest biomass (1mark)

9. The diagram below shows the position of an image formed in a defective eye.



Name the parts labelled J, K and L.

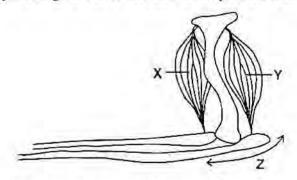
c)

(3 marks)

- State two functions of parts labelled M.
- 20. Explain the following terms as used in evolution,
 - a) Homologous structures
 - b) Analogous structures
- 21. a) Name two supporting tissues in plants.

(2 marks)

b) Study the diagram below and answer the question that follows.



Identify the muscle represented by X and Y.

(2 marks)

ii) Describe how muscle X and Y cause straightening of joint Z.

(2 marks) (1 mark)

c) Name joint Z. 22. State two roles of adrenaline in man.

(2 marks)

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KANGEMA/MATHIOYA FORM 4 JOINT EXAMINATION

231/2

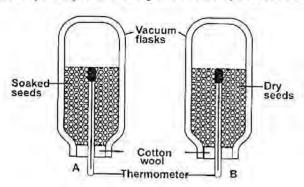
BIOLOGY

PAPER 2

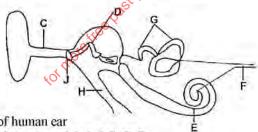
(Theory)

JULY/AUGUST 2016

A student set up an experiment using soaked and dry seeds as shown below.



	State the objective of this experiment. (a) State the observations made in each of the flask after 24 hours. (b) Account for the observation made in (b) above. (c) Suggest why vacuum flasks were used in this experiment	(1 mark)
	(a) State the observations made in each of the flask after 24 hours.	(2 marks)
	(b) Account for the observation made in (b) above.	(2marks)
	(c) Suggest why vacuum flasks were used in this experiment	(1 mark)
	(d) What alteration would you make in the set up to make the results more reliable?	(1 mark)
	(e) Why should the seeds be washed with antiseptic solution.	(1 mark)
2.	a) Differentiate between the mode of fertilization in higher plants and in manimals	(2 marks)
	b) Explain the role of the following hormones in the female menstrual cycle,	
	(i) Oestrogen	(2 marks)
	(ii) Luteinising hormone	(2 marks)
	c) Give two functions of the placenta during pregnancy.	
3.	The equation below represents a metabolic reaction that occurs in the mammalian liver.	
	Amino acids → organic compounds + urea	
	a. Name the process.	(1 mark)
	b. What is the importance of the process to the manufal	(1 mark)
	c. What is the source of the amino acids in the process named in (a) above?	(1 mark)
	 State three ways through which organic compounds produced in the reaction are utilized in animal's body 	. (3 marks)
	e. What is the difference between essential and non-essential acids?	(2 marks)
4,	The diagram below shows the structure of Thuman ear.	



a.	State functions of human ear	(2 marks)
b.	Give the name of structures labeled C, G, F	(3 marks)
C.	i) What is the function of the structure labeled H	(1 mark)
	ii) Name the structure in ear that detects waves	(1mark)
d	In which structure of the ear is the velocity of the sound transmission fastest	(1 mark)
-	a de la companya del companya de la companya del companya de la co	

5. A common species of rats has individuals with white, black or grey coats. During a study, a rat with white coat was crossed with a rat with a black coat. Both parents were pure lines. All the off springs in FI generation had grey coats. Using letter B to represent the gene for black coat and W for white coat.

	represent the gene for brack coat and w for white coat.	
a)	Work out through a genetic cross the phenotypes of the FI generation.	(4marks)
b)	Give a genetic explanation of the nature of the offspring in FI generation.	(1mark)
c)	State the significance of a test cross in study of genetics.	(1 mark)
d)	State the importance of crossing over in meiosis.	(1mark)
e)	Name one example of a characteristic in man that is transmitted by multiple alleles.	(1 mark)

SECTION B: (40 MARKS)

Answer question 6 (compulsory) and either question 7 or 8.

The table below shows the effect of predation in a laboratory experiment using Paramecium Aurelia and yeast cells, cultured in a solution containing sugar.

Time (hour)	2	4	6	8	10	12	14	16
Paramecium	20	90	120	95	50	20	40	60
Yeast per 15cm ³	60	140	100	65	25	50	80	100

Using the same exes, plot graphs to show curves of Paramecium aurelia and yeast

(7 marks)

At what time was the population of <u>Paramecium aurelia</u> and yeast the same

(2 marks

Explain the relationship between Paramecium aurelia and yeast. c)

(2 marks)

What is the approximate time lapse between the maximum population of yeast and maximum population of paramecium? Suggest a reason for this lapse. (2 marks)

Account for the shape of the graph of Paramecium aurelia between:

2 and 6 hours

(3 marks)

ii) 6 and 12 hours (3marks)

Suggest what would happen to the population of paramecium if the temperature was lowered to 0°C. i)

(1 mark)

7. Describe the

f)

b)

Process of inhalation in mammals.

(10 marks) (10 marks)

Mechanism of opening and closing of stomata. a) Describe how the digestion of a protein is achieved in the following parts of the alimentary canal.

i) Stomach ii) Duodenum (4 marks)

Describe the process of absorption of water from the root hair to the xylem of the root i)

(4 marks) (8 marks)

Describe how temperature and light intensity affect the rate of transpiration.

(4 marks)

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KANGEMA/MATHIOYA FORM 4 JOINT EXAMINATION

BIOLOGY

PAPER 3

July/August 2016

- 1. You are provided with solution Q in a boiling tube. Take a drinking straw and gently blow into the solution watching it carefully.
 - Record any change noticed. i)

(1mark)

Name the excretory product responsible for the change observed in (a) (i)

- (1mark)
- iii) Name the physiological process that brought about the above observed change in(a) (i) iv) Write a word equation summarizing the reaction in (a) (iii) above.

(1 mark) (2 marks)

- You are provided with specimens R and W. Using scalpel blade provided make a longitudinal section through the specimens R and W to obtain two identical halves.
- Make a large labelled drawing of specimen R.
- Give two differences and two similarities of structures of specimen R and W.

Differences

ii)

(2 marks)

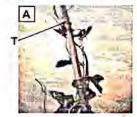
Similarities

(2 marks)

What is the function of plumule sheath in specimen W? c)

(2 marks)

Examine photographs A, B1 and B2 carefully and answer the questions that follow. B2 was extracted from B1.







i) What is the name given to the coiled part labelled T found on specimen A.

(1 mark)

(1 mark)

(1 mark)

- Name the type of response exhibited by the coiled part on specimen A
- iii) Explain how the response mentioned in a (ii)- above takes place.
- State one adaptative role of the response mentioned in a (ii) to the plant.
- With a reasons identify the agent of pollination for specimen in photographs B1 and B2 b) i) Agent

Reason To which class of plants was specimen B1 and B2 obtained give a reason.

Class Reason

(1mark) (1 mark)

Study the photomicrograph provided and answer the questions that follow. Calculations and any other working must be 3. shown in the spaces provided.



- (a) Identify the structure in the photomicrograph. (1 mark)
- (b) The structure in the photomicrograph has a magnification of X300,000. Calculate it real size. (4marks) Identify the process shown in the photomicrograph. (1mark)
- Name the exact stages and phases of the process shown in the photomicrograph.

(d) Name one part in plant and one part in an animal in which the process takes place. Plant part

(1 mark) (1 mark)

Animal part Name the products of the process at its completion. (e) i)

(1 mark)

(2 marks)

Plants products Animal products

ii) Using a pencil, draw on the micrograph the boundaries of the products that will form at the end of the process.

(Imark)

iii) What is the significance of the process shown in the photomicrograph.

(2 marks)

KIMA JOINT EVALUATION TEST - 2016

BIOLOGY

PAPER 1

(Theory)

July/August 2016

Time: 2 hours

State the function of the following cell organelles. (2marks)

a) Lysosomes

b) Nucleolus

(1mark) by that is a cell?

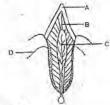
b) Define the meaning of the following terms;

i) Entomology (1mark)

ii) Genetics (1mark)

3. a) Name the source of hydrochloric acid in the mammalian stomach. (1mark)

b) The diagram below represents internal structure of a mammalian tooth.



Name the parts labeled B and D.

(2marks)

4. The table below shows the percentage composition of carbon (iv) oxide and oxygen in inhaled and exhaled air.

Gases	Inhaled air	Exhaled air
Oxygen	20%	17%
Carbon (iv) oxide	0.04%	4.0%

Explain the differences in percentage of the two gases in inhaled and exhaled air.

(2mark)

a) Oxygen

b) Carbon (Iv) oxide

5. The diagram below represents a pyramid of biomass derived from certain Ecosystem.



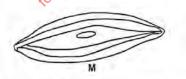
a) Suggest the type of ecosystem from which the pyramid was derived.

(1mark)

b) State the significance of short food chains is an ecosystem.

(1mark)

The figures below illustrate specialized cells in an animal body.



a) Identify the cell M and N.

(2marks)

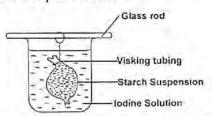
b) State the structural differences between M and N

(2marks)

Which of the above specialized cells is found in the gut.

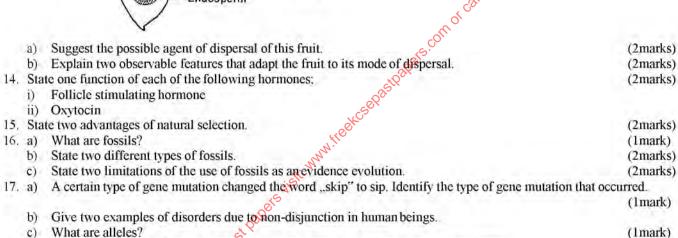
(1mark)

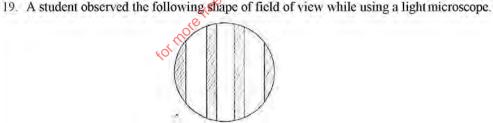
7. An investigation was set up as shown below.



After 30 minutes, starch suspension had turned blue-black while iodine solution retained its colour.

Biology p1, p2&p3 Name the physiological process that was being investigated in the experiment. (1mark) Account for the results observed after 30 minutes. (3marks) A certain mammal has no incisors ,no canines .6 premolars and 6 molars in the upper jaw, in the lower jaw , there are 6 incisors, 2 canines, 6 premolars and 6 molars. Write down the dental formula of this mammal. (1mark) What is the mode nutrition for this mammal? ii) (1mark) Give a reason for your answer in (ii) above. iii) (1mark) 9. a) Name the blood vessels that supplies the cardiac muscles with its requirements. (1mark) State the congenital defect of the blood vessels resulting from prolonged large intake of cholesterol in the blood. (lmark) What is the importance of the thicker muscular wall of the left ventricle of a mammalian heart? (2marks) 10. a) Name the respiratory surface in insects. (1mark) ii) State any one feature that adapts the structure named in a(i) above to its function. (1mark) b) Why are the gills of fish highly vascularized? (1mark) Name the products of anaerobic respiration in plants. (1mark) 11. a) Give any two economic importance of the products named in (a) above. (2marks) b) State any one role of the pollen tube during fertilization. (1mark) 12. a) A female frog lays many eggs, spaced out along jelly-like straw. State two importance of this. (2marks) 13. The diagram below represents the vertical section of a fruit. Fibrous Mesocarp Hard waterproof endocarp Endosperm

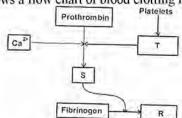




18. State two ways in which floating leaves of aquatic plants are adapted to gaseous exchange.

Define the term "field of view. (1marks) If a student counted 20 cell across the field of view. Calculate the size of 1 cell in micrometers. (2marks) State the function of condenser of a light microscope. (1mark)

20. The diagram below shows a flow chart of blood clotting mechanism in a human.



(1mark)

(2marks)

Biology p1, p2&p3 Name the enzymes represented by the letters T and S. (2marks) Name the final products of the mechanism represented by letter R. (1mark) 21. Explain one way on how each of the following adaptations reduces transpiration in xerophytes. a) Sunken stomata (1mark) b) Thick cuticle (1mark) 22. A student observing a drop of water under the power objective lens of a microscope observed an organism and drew the following organism. Cytoplasm Contractile vacuole Suggest the kingdom to which the organism belongs. (1mark) Identify the organism (1mark) b) Give an example of a disease caused by the organism. (1mark) c) 23. a) Name two sites where gaseous exchange takes place in terrestrial plants. (2marks) State the importance of the following features in gaseous exchange. Cartilage in the trachea (1mark) i) Moisture on the surface of the alveoli. (1mark) ii) Give two reasons why the evolution of human enabled him to survive better than his hominid ancestors. 24. a) (2marks) b) Why is Lamarck"s theory of evolution not accepted by biologists today? (1mark) 25. The diagram below represents a neurone. M (1mark) Name the neurone shown in the above diagram. State the functions of parts labeled N and M. (2marks) Using an arrow indicate the direction of impulse transmission on the diagram. (1mark) c) Explain the role of the following factors in breaking seed dormancy. Light (1mark) b) Soaking in water (1mark)

KIMA JOINT EVALUATION TEST - 2016

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 2

(Theory)

July/August 2016 Time: 2 hours

SECTION A (40 MARKS)

- I. In a family of four children the father had blood group A while the mother had blood group B.
 - a) With the use of a punnet square workout the genotype of the offspring if the parents were were heterozygous.

(4marks)

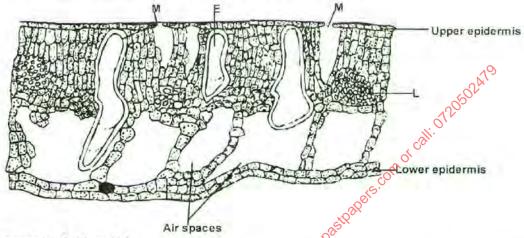
 The child of blood group AB can receive blood from all other children. Explain.

(2marks)

c) The child of blood group O is referred to as a universal donor. Explain.

(2marks)

The diagram below represents a section through a leaf of a certain plant.



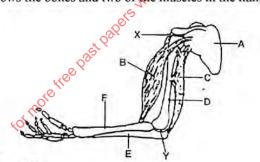
a) Name parts labeled L and M. (2marks)

b) i) Suggest the habitat of the plant whose leaves has internal structure represented by diagram above. (1mark)

ii) Give three reasons for your answer in b(i) above. (3marks)

c) Name the end product of photosynthesis likely to be found in part M.
 d) Write a word equation to show the products formed when product named in (c) above is used in cells.

3. The diagram below shows the bones and two of the muscles in the human arm



a) Name the parts A, C, E and F. (4marks)

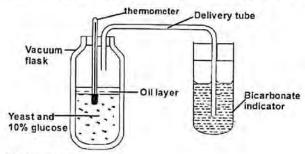
b) i) Name the type of joint present in part X and Y (2marks)

ii) What type of movement is possible at point X. (1marks)

What happens when the muscle labelled C contracts.

(1mark)

4. The set apparatus was assembled by a group of students to investigate some physiological process.

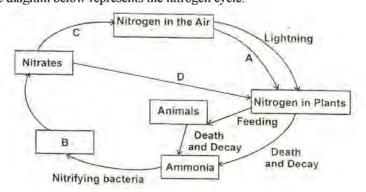


a) i) Give two aims of the experiment.

c)

(2marks)

		Biology p1, p2&p3
	ii) Explain observations expected after 24hrs.	(2marks)
b)	Before the experiment, the glucose was boiled the cooled.	
	i) Why was it necessary to boil the solution?	(1mark)
	ii) What was the importance of the oil layer in the experiment?	(1mark)
c)	Describe a control experiment for the set up?	
d)	Suggest one industrial application of the process being investigated?	(1mark)
5	The diagram below represents the nitrogen cycle	***************************************



(2marks)
(1 mark)
(1mark)
(1mark)
(1mark)
(2marks)
000

SECTION A (40 MARKS)

Answer questions 6 (Compulsory) and either questions 7 or 8.

6. The glucose level in mg per 100cm³ of blood was determined in two person Y and Z. Both had stayed for six hours without taking food. They were fed on equal amount of glucose at the start of experiment. The amount of glucose in their blood was determined at intervals. The results are shown in the table below.

Time in minutes	Glucose level in blood in Mg/100cm3		
	Y	Zw	
0.	85	.78	
20	105	110	
30	105	110	
45	130	170	
60	100	195	
80	93	190	
100	9390	140	
120	90	130	
140	88	120	

a)	On the grid provide, plot graphs of glucose levels in blood against time on the same axis.	(7marks)
b)	What was the concentration of glucose in blood of Y and Z at the 50th minute?	(2marks)
c)	Account for the level of glucose present in Y.	(2marks)
i)	During the first 45minutes.	(2marks)
ii)	After 45 th minute to the end.	(2marks)
d)	Account for the decrease in glucose level in Z after 60 minutes.	(2marks)
e)	Low blood sugar is harmful to the body. Explain.	(3marks)
7.	Explain the functions of the parts of the mammalian ear.	(20marks)
8.	 a) Explain how leaves of mesophytes are suited to their functions. 	(10marks)
	b) Briefly describe how secondary thickening occurs in woody plants	(10marks)

KIMA JOINT EVALUATION TEST - 2016

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

231/3

BIOLOGY

PAPER 3

(Practical)

July/August 2016

Time: 11/4 hours

a) You are provided with substances labeled S, T, U, X, Y and K. S is food substances, T is iodine solution, U is Benendict's solution, X is 10% sodium hydroxide solution (NaOH) Y is 1% copper sulphate (CuSO₄) and K is the DCPIP solution. Using the food substance and the reagents provided carry out tests to determine the substances in S. (12 marks)

Food substance being tested for	Procedure	Observation	Conclusion	

Using the deductions in (a) above state and explain ways in which a human body could benefit from substance S.

(3marks)

Photographs below represent specimen taken from three species of plants. a)







Describe the androecium in specimen N1

(2marks)

ii) Identify the class to which the specimen N1 and B belong. Give a reason in each case. (4marks)

Specimen N1.....

Reason....

Specimen B

Reason.....

iii) Suggest the agent of pollination of the specimens N1 and N2

(1mark)

iv) Give reasons for your answer in a (iii) above.

(3marks)

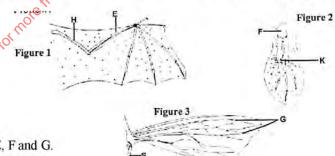
Label non-essential part of the flower of specimen N2.

(1mark)

With a reason state the agent of polination of the flower in specimen.

(2marks)

The following figure represents the forelimbs of certain animal species. Study them and answer the questions that follow.



Name the parts labeled E, F and G.

(3marks)

b) Name the type of joint at point K (1mark)

Which features represent c)

Analogous structures

(1mark)

ii) Homologous structures iii) Give a reason for (ii) above (1mark) (1mark)

What are vestigial organs?

(1mark)

ii) Give two examples of vestigial organs in Humans

(2marks)

State the type of skeleton found;

In figure I i)

d)

(1mark)

ii) On the part labeled S on figure 3

(1mark)

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 1

(Theory)

July/August 2016

Time: 2 hours

Give the name of the following responses:

Curvatures of plant shoot towards light. (1mark)

Coiling of plant shoot round a supporting structure.
 Part of one strand of a DNA molecule was found to have the following sequence. Show the complementary strand

(1mark)

G-C-C-A-G-A-T-C-A-C

(1mark)

Give two differences in content between umbilical vein and umbilical artery.

(2marks)

Define the following terms as used in ecology.

i) Carrying capacity

ii) Biosphere

5

(1mark) (1mark)

State taxonomic group that contain:

i) Individuals with most similarities

(1mark)

The largest number of individuals
 Explain why glucose and proteins are absent in the urine.

(1mark) (3marks)

State two essential features of a respiratory surface.

(2marks)

8. The equation below represents a certain biological process.

Sucrose ____

a) Name the process Q

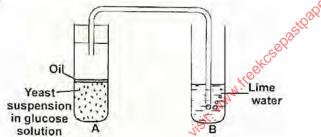
(1mark)

call. 07205024

b) Identify substance R

(1mark)

9. The diagram below illustrates an experiment to demonstrate a certain biological process. The glucose solution was boiled and then cooled.



a) What process is being investigated?

(1mark)

b) i) What observations would you expect in test tube B at the end of the experiment.

(2marks)

ii) Explain the observations made in b(i) above.

(2marks)

10. State the field of biology described below:

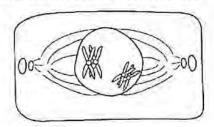
a) Study of interrelationship of living things in their surroundings.
 b) Study of fossils.

(lmark)

11. Name the plant hormone that is involved in topic responses.

(1mark) (1mark)

12. The diagram below represents a certain stage in cell division.



a) i) Identify the type of cell division.

(1mark)

Give reasons for your answer ina(i) above.

(2marks) (1mark)

b) State the stage of cell division shown in the diagram above.
 13. Explain the importance of the following procedures during microscopy;

(1mark)

i) Use of a cover slipii) Mounting the specimen on a drop of water.

(1mark)

The diagram below represents a certain plant section.

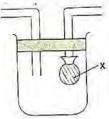


Identify the organ from which the above structure was obtained, (1mark)

 State the class to which the plant belongs. (1mark)

ii) Give a reason for your answer inb(i) above. (lmark)

15. Study the diagram below and answer the questions that follow.



Identify the apparatus. (1mark)

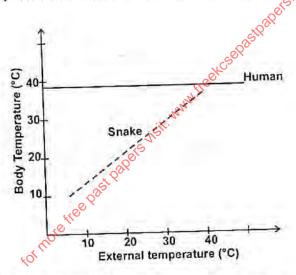
State the functions of the part labeled x. (1mark)

16. State the difference between a cell wall and a cell membrane. (3marks)

17. Identify the type of immunity in the following circumstances: When a baby obtains antibodies through breastfeeding. (1mark)

When a young child suffers from measles and recovers from it. (1mark)

18. The graph below shows the relationship between body temperatures and external temperatures in a human being and a snake. Study it and answer questions that follow.



What happens to the temperature of each organism as the external temperature increases. (2marks) Human

Snake

Humans are described as homoithermic. State the advantage of this condition. (1mark)

19. State any three characteristics of a population. (1mark)

What are homologous structures?

(1mark) Give two examples of the above structures in animals. (2marks)

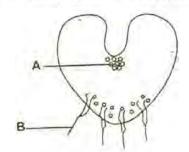
21. State the role of paired fins in a bony fish. (2marks)

22. During a field study, a student at Muringa secondary school collected a certain organisms whose actual length was four centimeters. He made a drawing of the organism whose length was 12cm. Calculate the magnification of the drawing. (2marks)

The diagram below represents a certain mammalian tooth. Study it and answer the questions that follow.



	Biology p1, p2&p3
i) Identify the type of tooth.	(1mark)
 How is the tooth you have identified in (i) above adapted to its function. 	(1mark)
 Name three sites for gaseous exchange in terrestrial plants. 	(3marks)
 State two hormones that control metamorphosis in insects. 	(2marks)
Study the diagram below and answer the questions that follow.	(2marks)



Name the parts labeled A and B.

(2marks)

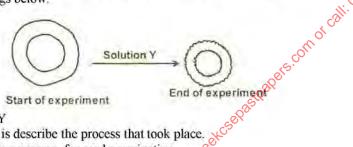
27. What is the process that leads to addition or loss of one or more chromosomes?

(1mark)

28. State the importance of support in plants. (3marks)

29. Humans have certain genes on the X chromosomes that lack a corresponding allele on the Y chromosome. Some of these genes are known to be responsible for certain disorders. Name two such disorders. (2marks)

30. Red blood cells from a rabbit were placed in a petri dish containing a certain solution. A drop from the petri dish was then mounted on a slide and observed under a light microscope after 20minutes. He made the drawings below.



Name solution Y What term is to is describe the process that took place. (lmark) (1mark)

31. Give three conditions necessary for seed germination.

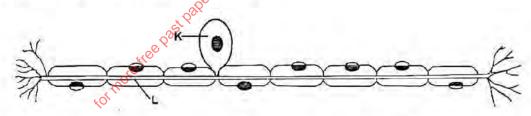
(3marks)

32. State the functions of the following cell organelles; a) Centrioles

b) Lysosomes

(1mark) (1mark)

The diagram below represents a mammalian neurone.



Name the parts labeled K and L

(2marks)

Identify the type of neurone shown in the diagram above.

(1mark)

What is a synapse.

(1mark)

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 2

(Theory)

July/August 2016 Time: 2 hours

SECTION A (40 MARKS)

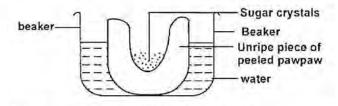
- I. Plants with red flowers were crossed with plants with white flowers. The resultant F1 generation had pink flowers.
- Using R for red flowers and W for white flowers, work out the genotypes of F2 generation. (4marks) a)
- b) Determine the genotypic ratio of F2 generation.

(lmark)

- Explain why a cross between red flowered plants and white flowered plants produced pink flowers. c)
- (1mark)
- If the total number of F2 generation offsprings was 7324. Calculate the number of red flowered plants. d)

(2marks)

2. A group of form 1 West students set up an experiment to demonstrate a certain physiological process. The set up was left to stand for 20minutes.



Name the physiological process demonstrated in the experiment a)

(1mark)

What observations were made after 20minutes? b)

(2marks)

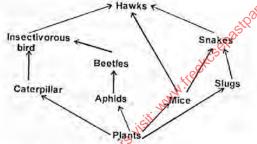
Explain the observations you have made in (b) above. c)

(3marks)

State two roles of the process you have made in (b) above. d)

(3marks)

Study the food web shown below and answer the questions that follow. 3.



Write down two food chains from the web that end with a)

Tertiary consumer

(2marks)

Name all the organisms that occupy the second trophic level. b)

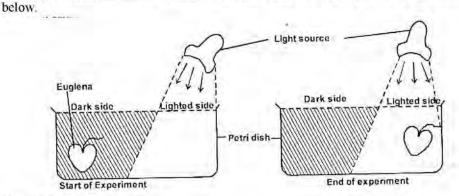
(2marks)

What is the other name of the second tropic level c)

- (1mark)
- Suggest another group of organisms not shown in the food web but are of great importance in ecosystem. d)
- (1mark)

What is the short term effect of removing all slugs from the ecosystem.

- (2marks)
- e) 4. In an experiment, Euglena was put in a petri dish. One side of the petri dish was illuminated and the other kept dark as shown



Name this type of response.

(1mark)

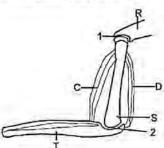
State the significance of this type of response in an organism. b)

(1mark)

- Other than light, outline other two factors that may cause change of position in Euglena and state the respective type of c) (2marks)
- If the above experiment was repeated using a young potted seedling, name the type of response which will be observed.

(lmark)

5. The diagram below represents a human arm. Study it and answer the questions that follow.



a)	Name bone T and R	(2marks)
b)	Name muscle C and D	(2marks)
c)	 i) Identify the fluid found at joint 2. 	(1mark)
	 State the function of the fluid in (i) above. 	(1mark)

i) What is the type of the joint found at part labeled 1.ii) Differentiate between a tendon and a ligament.

(1mark) (1mark)

SECTION B:

d)

Answer question 6 (compulsory).

6. Camels are mammals that live in hot dry deserts where daytime air temperature may rise over 40°c and fall below 0°c at night. The following data shows the body temperature of a camel at different times in one day

Time of day (24hr clock	2400	0300	0600	0900	1200	1500 🟑	1800	2100	2400
Body temps. In 0°c	37.5	35.5	33.5	37.0	40.0	40.20	40.8	38.8	37.5

a) Plot a graph to show the body temperature of the camel at different times of the day. (6marks)

b) What is the difference between the highest and lowest temperatures of the came during the period shown by the graph.

(1mark)

c) The camel has the following features which allow it to live under the desert conditions. To what advantage are they to the camel?

	came!/	
	i) Storing fat under its hump.	(2marks)
	ii) Storing very little fat under its skin.	(2marks)
d)	What is the significance of having very low temperatures at 0600 hours?	(2marks)
e)	i) Explain how sweating cools the body.	(2marks)
	ii) State two excretory wastes lost through the skin.	(2marks)
f)	Explain what happens to blood vessels in the mammalian skin on a hot day.	(2marks)
g)	Which part of the brain regulates body temperatures in mammmals.	(1mark)
7.	Explain the mechanism of inhalation in marinals.	(10marks)

b) Explain the echanism of finalation in manufals.

b) Explain why factors that affect the rate of breathing in humans.

Explain the causes, the effects and control of air pollution.

(10marks)

(20marks)

NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

231/3

BIOLOGY

PAPER 3

(Practical)

July/August 2016 Time: 1¹/₄ hours

1.	You are provided with soaked bean seeds. Remove and discard the testa of about 10 seeds and crush the cotyledons using a
	pestle and mortar to obtain a paste. Use the paste for the tests that follow.

a) i) Put 4ml of hydrogen peroxide in a test tube, then add a spatulaful of the paste. Recordyour observations. (1mark)

ii) Identify the gas evolved in a (i) above and give a reason. (2marks)

b) Use the reagents provided to carry out food tests on the remaining paste. Record your work in the table below. (6marks)

Food substance	Procedure	Observation	Conclusion
<u> </u>			1 1
			112

c) What is the nutritional value of paste used?

(3marks)

a) You are provided with a specimen labeled M. Study it carefully and answer the questions that follow.

i) Using observable features only suggest the most probably type or agent of pollination. (3marks)

ii) Remove the calyx and corolla, and then draw a well labeled diagram of removing part of the specimen M. (5marks)

iii) Identify the type of ovary position exhibited by the specimen M. (1mark)

iv) Explain what happens to the various parts of the flower after fertilization.

(4marks)

Study the photographs labeled K and L which were obtained from the same plant.



i) Identify the sub-division to which they belong.

(1mark)

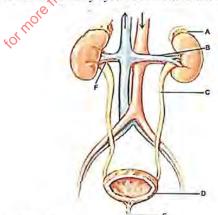
ii) Give reasons for your answer.

(2marks)

iii) Identify the reproductive structure represented in K and L.

(2marks)

3. The diagram below represents the arinary system of a mammal. Study it carefully and answer the questions that follow.



a) Name the parts labeled C, D and E. (3marks)
b) i) Identify the part labeled A. (1marks)

ii) State the hormone produced by the part you have identified in b(i) above and its function. (2marks)

c) Which of the blood vessels (B and F) contains:

A higher concentration of urea. (1mark)

ii) Lower concentration of oxygen. (1mark)

d) State how the nephrons of desert mammals are structurally adapted. (2marks)

KERICHO SUB - COUNTY JOINT EVALUATION 2016

231/1

BIOLOGY

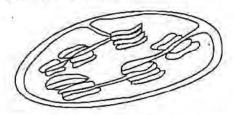
PAPER 1

KERICHO

Name the branch of Biology that involves the study of:

2mks

- a) Organisms for the sake of classifying them
- b) Microscopic organisms
- Below is a diagram of an organelle.



a) State the function of the organelle drawn above.
 b) Name the parts of the organelle where

i) Oxygen gas is produced as a byproduct lmk
ii) Carbon (IV) Oxide is utilized. lmk

3. a) Why is the wall of the left ventricle thicker than that of right ventricle.

b) State three adaptions of xylem to water transportation.

Why do plants lack complex excretory system?

3mks

3mks

a) State the formula for calculating linear magnification of a specimen when using a hands lens.

b) Give one merit of the use of the following microscopes 2mks

i) Light microscope

ii) Electron microscope

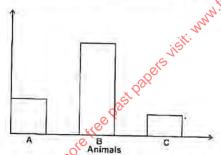
6. a) i) Name the respiratory surface in insects.

ii) State any one feature that adapts the structure named in a (i) above to its function.

1mk
Why are the fish gills highly vascularized?

1mk

The following chart illustrates the quantity of urine passed out by four animals of different species in different habitat.



a) Name the forms in which the following organisms are likely to excrete their nitrogenous wastes. 2mks

Animal B

Animal C

b) Give two structural modification of the animal B that enables it to survive in its habitat.

2mks

8. a) What is meant by the term vestigial structures?

Imk

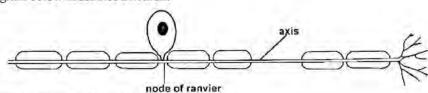
b) Name the type of evolution illustrated by

2mks

i) Hind limbs of birds

ii) Wings of birds and insects.

The diagram below illustrates a neuron.



a) Name the neurone drawn above
b) i) What is the function of the neuron e named in (a) above?
ii) What is the role of the node of ranvier?
Imk

10. a) Distinguish between a hinge joint and a ball and socket joint.
b) i) Name the cartilage pound between the based of the vertebral column.
Imk

 State the function of the cartilage named in b(i) above 	Biology p1, p2&p3
	1mk
In an experiment, it was observed that when termites are exposed to light they move to darker	
Name the types of response by the termites.	lmk
b) What are survival values of the type of response exhibited by the termites?	2mks
Oil can be applied on stagnant control the spread of Malaria	
a) How does this practice control the spread of Malaria?	Imk
b) Give a reason why this practice should be discouraged?	Imk
Give three reasons for the loss of energy from one trophic level to the next in a food chain.	3mks
The figure below illustrates a portion of a chromosome with genes named A,B, C,S,Q and R.	
Use the diagram similar to the one above to illustrate the changes if the above chromosome un	dergoes the following mutation
affecting only gene C and S	
A B C S Q R T	
i) Deletion	lmk
ii) Inversion	lmk
iii) Duplication	lmk
Other than sexual intercourse, name the other ways by which HIV/AIDS Is spread. 3mks	
four cylinders of potato were carefully dried on blotting paper and weighed. Each piece weighe	ed 3g. One was placed in each
as shown in the drawing below.	a of one was placed in each
as shown in the drawing below.	
	1 ₀
	×
air 25cm³ 25cm³ 5% 25cm³ 20%	
distilled water Sucrose solution	
a) After 48hours, which potato would be the heaviest	2mks
b) Name the substance whose movement was responsible for the weight changes in potato cy	linders. Imk
c) Name the process which was responsible for this movement in tubes B, C and D.	
	lmk
The following equation represents aerobic respiration.	
The following equation represents aerobic respiration.	
The following equation represents aerobic respiration.	
The following equation represents aerobic respiration.	lmk
The following equation represents aerobic respiration. $C_6 H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + Energy$ Glucose oxygen Carbon (IV) oxide a) Work out the respiratory quotient.	1mk 2mks
The following equation represents aerobic respiration. $C_6 H_{12}O_6 + 60_2 \rightarrow 6CO_2 + 6H_2O + Energy$ Glucose oxygen Carbon (IV) oxide a) Work out the respiratory quotient. b) State the importance of the respiratory quotient.	lmk
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The following equation represents aerobic respiration. C ₆ H ₁₂ O ₆ + 6O ₂ → 6CO ₂ + 6H ₂ O + Energy Glucose oxygen Carbon (IV) oxide a) Work out the respiratory quotient. b) State the importance of the respiratory quotient. The graph below represents the growth of an animal in a certain phylum. Mass in g Wass in g Time in days a) Name the type of growth pattern shown on the graph. b) Identify the process that occur at the start of W.	1mk 2mks 2mks 2mks
The following equation represents aerobic respiration. C ₆ H ₁₂ O ₆ + 6O ₂ → 6CO ₂ + 6H ₂ O + Energy Glucose oxygen Carbon (IV) oxide a) Work out the respiratory quotient. b) State the importance of the respiratory quotient. The graph below represents the growth of an animal in a certain phylum. Mass in g Wass in g Time in days a) Name the type of growth pattern shown on the graph. Identify the process that occur at the start of W. c) Name the hormone responsible for the process in (b) above.	1mk 2mks 2mks 2mks 1mk 1mk 1mk
The following equation represents aerobic respiration. C ₆ H ₁₂ O ₆ + 60 ₂ → 6CO ₂ + 6H ₂ O + Energy Glucose oxygen Carbon (IV) oxide water a) Work out the respiratory quotient. b) State the importance of the respiratory quotient. The graph below represents the growth of an animal in a certain phylum. Mass in g Time in days a) Name the type of growth pattern shown on the graph. b) Identify the process that occur at the start of W. c) Name the hormone responsible for the process in (b) above. Give two structural differences between smooth muscles and skeletal muscles.	1mk 2mks 2mks 2mks 1mk 1mk 1mk 1mk 2mks
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The following equation represents aerobic respiration. C ₆ H ₁₂ O ₆ + 60 ₂ → 6CO ₂ + 6H ₂ O + Energy Glucose oxygen Carbon (IV) oxide a) Work out the respiratory quotient. b) State the importance of the respiratory quotient. The graph below represents the growth of an animal in a certain phylum. Mass in g Mass in g Time in days a) Name the type of growth pattern shown on the graph. Identify the process that occur at the start of W. Name the hormone responsible for the process in (b) above. Give two structural differences between smooth muscles and skeletal muscles. Name the site in mammalian lungs where gaseous exchange occurs. a) Identify the organism that causes the following diseases. Trichonomiasis. ii) Amoebic dysentery.	1mk 2mks 2mks 2mks 1mk 1mk 1mk 2mks 1mk 2mks

24. The diagram below represents a bone in a mammal.



a)	Identify the bone.	lmk
b)	Name the bone that articulate with the above bone at part A.	1mk
c)	Name the joint formed at the part labeled B.	1mk

25. State the functions of the following in plants

i) Piliferous layer	Iml
ii) Percicycle	1ml
(iii) Root cap	1ml

26. Complete the table below for mineral nutrients in plants

. Complete me table be	low for inflictat futificities in plants.	71111/2
Mineral nutrient	Function	Deficiency symptoms
	Synthesis of protein and protoplasm	4200
Calcium		Structural growth and weak
	Formation of part of chlorophyll	Yellowing of leaf veins

27 Active yeast cells were added to dilute sugar solution in a container. The mixture was left in a warm room. After a few hour bubbles of gases were observed escaping from the mixture.

Write an equation to represent the chemical process

lmk

Ambe

b) What is the importance of the type of reaction in industries?

1mk

KERICHO SUB - COUNTY JOINT EVALUATION 2016

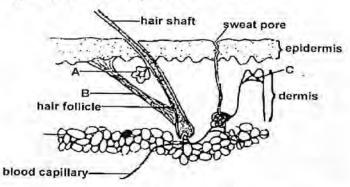
231/2

BIOLOGY

PAPER 2

KERICHO

The diagram below illustrates part of a human skin.



State the function of each of the part labeled A. 1mk State the actions of each of the following parts when the body temperatures fall below the normal. b) Part B i) 2mks ii) Part C 2mks How does the part labeled D help in osmoregulation. 1mk C) State what cause the gro2wsth of skin hair 1mk Explain one biological mechanism through which the skin offers protection to the body. 1mk

2. An experiment was carried out to find out the concentration of ions in the cell sap of an aquatic plant and that of the water in the pond in which they grew.

	Concentration	n in
IONS	Cell sap	Pond water
Na+	50	1.2
K+	49	0.5
Mg2+ Ca2+	11	3 14.
Ca2+	13	1.3 44
Cl-	101	1.3%

- a) i) Name the process by which the aquatic plant absorbs ions from the pond water.
 ii) Outline four roles of the process you have named in a (i) in a mammalian body.
 b) How can the rate of uptake of ions in and out of the cell be increased.

 Imk
- c) Name the part of the cell that allows passage of ions in and out of the cell.

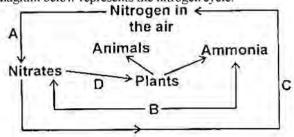
 Imk

 How does surface area to volume ratio affect the rate of diffusion?
- In humans haemophilia is caused by a recessive gene. A man whose mother was hemophiliac marries a normal woman whose father was hemophiliac let H represent dominant gene.
- a) Define the term recessive gene.
 b) What is the possible genotype of the woman?
 lmk
- ii) Using punnet square work out the genotype of the first filial generation. Show your working.

 4mks
- c) i) What is the probability of the daughter being haemophilic?

 Imk
 ii) State one advantage of mutation to plants.

4. The diagram below represents the nitrogen cycle.



a)	State the process labeled A and D.	2mks
b)	Name the group of organism labeled .	1mk
c)	Name the compound represented by B.	1mk
d)	i) Name the group of plants which promote process A.	1mk
	ii) State the part of the plant where process Atakes place.	2mks

		Biology p1, p2&p3
e)	How would excess pesticides in the soil interfere with process A.	2mks
5.	a) What is the difference between Darwinian and Larmackian theories of evolution.	2mks
	b) What is meant by the following terms. Give an example in each case	
	i) Homologous structures.	1mk
	Example	1mk
	ii) Analogous structures	1mk
	Example	1mk
	iii) Vestigial structures.	1mk
	Example	1mk
	SECTION B: 40MKS	

6. An experiment was carried out to investigate transpiration and absorption of water in bean plant in their natural habitat within adequate supply of water. The amount of water was determined in two hour intervals. The results were as shown below.

	Concentrations in		
Time of day	Transpiration	Pond water	
1100-1300	33	20	
1300-1500	45	30	
1500-1700	52	42	
1700-1900	46	46	
1900-2100	25	32	
2100-2300	16	20	
2300-0100	8	15	
0100-0300	4	11	

a) Using the same axes, plot graphs to show transpiration and absorption of water in grams against time	8mks
b) At what time of the day was the amount of water the same as transpiration and absorption?	1mk
c) Account for the shape of the graph of	
i) Transpiration between 1100 to 1900 hours	3mks
ii) Absorption between 1900 to 0300	2mks
d) What would happen to transpiration and absorption of water if the experiment was continued till 0500 hou	ırs?
ast the second of the second o	2mks
e) Name two factors that may affect transpiration and absorption at any given time.	2mks
f) Explain how the factors you named in (e) above affect transpiration.	2mks
7. Discuss the adaptions of the structures of the human eye to their functions.	20mks
8. Explain how the villi of the mammalian alimentary canal are adapted to their functions	10mks
b) Describe how different types of tropism adapts plants for survival in their habitat.	10mks

KERICHO SUB - COUNTY JOINT EVALUATION 2016

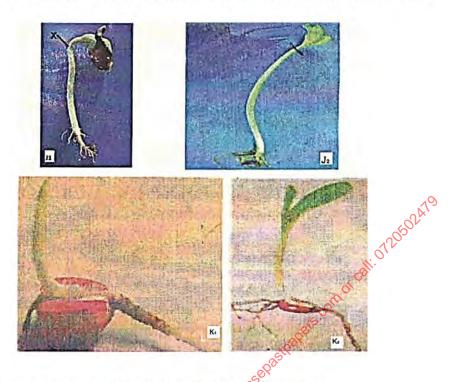
231/3

BIOLOGY

PAPER 3

KERICHO

1. a) You are provided with photographs of specimens labeled J1, J2, K1 and K2. Examine them.



With a reason name the classes to which specimen J1 J2 K1 and K2 belongs

4mks

J1 and J2

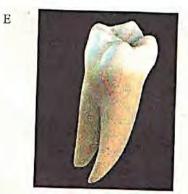
Reason K1

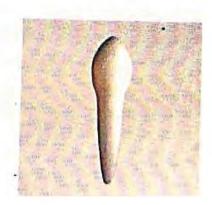
and K2

Reason

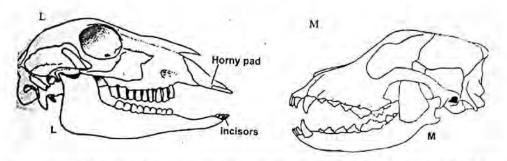
b)	i) Name the parts labeled X in specimen J1.6	1mk
	ii) What is the importance of the curvature	1mk
c)	Explain how the curved part in J1 WILL straighten so that the stem will look that of J2	3mks
d)	Name the part that protects the plumule in specimen K1 and K2	1mk
e)	Which of the following types of seedlings may form swelling on the roots later in its life?	1mk
f)	i) Name the structure found on the stem just below the leaves of specimen J2	1mk
	ii) State one function of the structure named in (i) above.	1mk
g)	i) What type cof germinataion is exhibited by specimen K1 and K2	1mk
3,	ii) Give a reason for your answer in g(i) above	1mk

2. Below are photographs of specimen labeled E and F which were obtained from the same anaimal examine them





		Biology p1, p2&p3
a)	With reason identify E and F	
	E	lmk
	Reason	1mk
	F	Imk
	Reason	1mk
b)	On photograph E label two parts of the specimen.	Imk
c)	Examine the following photographs labeled L and M	2mks



i) Suggest the diet of each of the animals whose skulls are shown on the photograph. Give reasons for your answer.

You are provided with set ups B₁ B₂ and iodine solution, Benedicts solution, white tile, dropper, boiling tubes, sources of heat,

pestles and mortar, scalpel, 10ml measuring cylinder, distilled water

a) i) Identify the conditions under which the seedlings in the setup B₂were grown 1mk

ii) Give a reason for your answer above 1mk

Select one seedling from each of the setups B₁ and B₂
Separately isolate cut and crush using the mortar and pestle the leaves from each seedlings. Place the crushed extract into separate test tubes labeled B₁ and B₂ and add 2ml of distilled water into each extract.

Using the reagents provided carry out food tests on B₁ and B₂ solution and complete and complete the tables below.

NANDI NORTH AND NANDI CENTRAL JOINT EXAMINATIONS 2016

231/2 BIOLOGY PAPER 2 (THEORY) JULY / AUGUST 2016 TIME: 2 HOURS

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided.

1. Study the diagram below and answer the questions that follow.

(a) (i) Name the part labeled E and F. (2mks)
(ii) State a function of the parts labeled A and C. (2mks)

(b) Name each of the parts that:

(i) Responds to hormone oxytocin. (1mk)

(ii) Responds to progesterone hormone. (1mk)

(iii) Acts as an endocrine gland. (1mk)

(c) Name the structure of the ovary that secretes progesterone hormone in the first four months of pregnancy. (1mk)

 Pure breed of red flowered and pure breed of white flowered 4 o clock plants were crossed to give F₁ off-springs which had pink flowers. The F₁ were selfed.

(a) Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F₂.

(4mks)

(b) Work out the genotypic ratio of a cross between F₁ offspring and the white flowered plane

Comment on the gene(s) controlling the colour of flowers mentioned above (1mk)

(3mks

Study carefully the photograph shown below.



a)	(i) Identify the cells above.	(lmk)
u)	(ii) State two functions of the cells shown above.	(2mks)
b)	Explain how the above cells are adapted to their function.	(2mks)
c)	Name a parasite that may invade and destroy the cells above.	(1mk)
d)	Suggest two bones in an adult man, which produce the cells shown above.	(2mks)
4.	The set of apparatus below was assembled by a group of students to investigate some physiological process.	
(a)	(i) Give two aims of the experiment.	(2mks)
	(ii) Explain observations expected after 24 hours.	(2mks)
(b)	Before the experiment, the glucose was boiled then cooled.	7 / 21.59
	(i) Why was it necessary to boil the solution?	(1mk)
	(ii) What was the importance of oil layer in the experiment?	(1mk
(c)	Describe a control experiment for the set up?	(1mk)
(d)	Suggest one industrial application of the process being investigated.	(1mk)
5.	(a) What is meant by the following terms?	(2mks)
	(i) Adaptive radiation:	
	(ii) Vestigial structures:	
(b)	Evolution is an ongoing process and is still going on even today. State two pieces of evidence which suggests	that evolution
	is still taking place.	(2mks)
(c)		(4mks)
	(i) Predators	
	(ii) Diseases	

SECTION B (40 MARKS)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

6. An experiment was carried out to investigate the effect of temperature on the rate of reaction catalyzed by an enzyme. The results are shown in the table below.

Temperature (°C)	Rate of reaction in mg of products per unit time
5	0.2
10	0.5
15	0.8
20	1.1
25	1.5
30	2.1
35	3.0
40	3.7
45	3.4
50	2.8
55	2.1
60	1.1

(a)	On the grid provided, draw a graph of rate of reaction against temperature.	(6mks)
(b)	When was the rate of reaction 2.6mg of product per unit time?	(2mks)

(c) Account for the shape of the graph between:

(2mks)

(i) 5° C and 40° C

(ii) 45°C and 60°C

7.

(d) Other than temperature, name <u>two</u> ways in which the rate of reaction between 5°C and 40°C could be increased. (1mk)

(e) (i) Name <u>one</u> digestive enzyme in the human body which works best in acidic condition. (1mk)
(ii) How is the acidic condition for the enzyme named in (e) (i) above attained? (2mks)

(f) The acidic condition in (e) (ii) above is later neutralized.

(i) Where does the neutralization take place? (1mk)

(ii) Name the substance responsible for neutralization. (1mk)

(a) Describe secondary growth in flowering plants? (14mks)

(b) Explain the importance of support and movement in plants. (6mks)

8. Describe economic importance of the following Kingdoms:-

(a) Monera (10mks)

(b) Fungi (10mks)

NANDI NORTH AND NANDI CENTRAL JOINT EXAMINATIONS 2016

231/3 **BIOLOGY** PAPER 3

CONFIDENTIAL

Each student to be provided with the following:-

- Specimen W Clean fresh large Irish potato.
- Cork borer 0.5cm diameter
- 3. Distilled water
- 4. 2 beakers – 100ml each
- Concentrated sucrose solution labeled X 100ml 5.
- Distilled water labeled Y 100ml
- 7. Tissue paper
- 30cm ruler 8.
- 2 labels 9.
- 10. Measuring cylinder
- 11. Scalpel
- 12. Stop watch

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231/3

BIOLOGY

PAPER 3

(PRACTICAL)

JULY / AUGUST 2016

TIME: 13/4 HOURS

SECTION A (40 MARKS)

Answer all questions in this section in the spaces provided

- You are provided with specimen W. push a cork borer through specimen W to remove 4 cylinders of potato tissue. Cut off one end of each cylinder. From the cut end measure 40mm length and cut the cylinder. Repeat this for the other three cylinders. Put 25ml of solution X in a beaker labeled X and 25ml of solution Y in a beaker labeled Y. Place two cylinders in a beaker containing solution Y and the other two in a beaker containing solution X. Leave the experiments for 45 minutes. After 45 minutes remove the cylinders and mop them up with a tissue paper.
- (a) Measure and record the length of each cylinder in the table below.

(8mks)

Cylinder in solution	Initial length	Final length	Average length	% change in length
X 1	(v			
2 2				
Y 1				
2				

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Ļ	v	Account for	oosei vaiions	mauc	III SO	шиош

(i) X:

(ii) Y: (2mks)

Below are photographs of three sets of seedlings labeled A₁, A₂ and B. Examine them and use them to answer the questions that follow.

(i) Name the phenomenon exhibited by seedlings in set A_2 . (1mk)

(ii) Give a reason why plants exhibit the phenomenon named in (i) above. (1mk)

(iii) Name the response exhibited by the seedlings in set B. (1mk)

(iv) State the stimulus that caused the response in (iii) above. (1mk)

(v) Explain how the response named in (iii) above have occurred. (3mks)(vi) State the observable differences between seedlings in set A₁ and A₂

(3mks)Set A₂ Set A₁

State and explain the type of germination in seedling A_1 . (2mks)

(viii) State the conditions under which the seedlings in set A₁ and A₂ were grown.

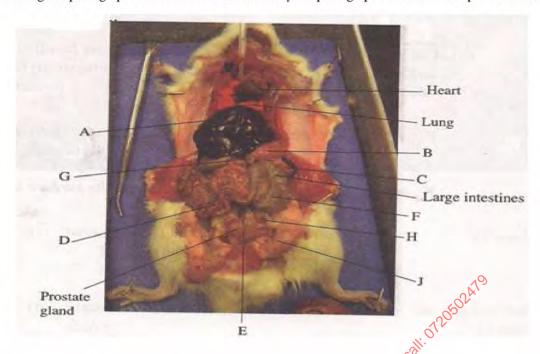
(2mks)

(2mks)

Set A₁

Set A₂

The following is a photograph of a dissected mammal. Study the photograph and answer the questions that follow.



(a) Name the structures labeled A, B and C.

(3mks)

(b) On the photograph, label and name the site of production of vitamin K.

(1mk) (6mks)

PART	IDENTITY	FUNCTION	
В		000	
С		CSON .	

(d) (i) State the sex of the dissected mammal.

A

(1mk)

(ii) Give a reason for your answer in (d) (i) above.

(c) Identify and state one function of the following parts:-

(1mk)

(e) Identify the class to which the specimen belongs.(f) State the reason for your answer in (a) (i) above.

(1mk)

(1mk)

for more free past pape

RAISMARADE JOINT EXAMINATIONS COUNCIL

231/1 BIOLOGY Paper 1

	2 hours	
1.	Give one of the role of the following organelles	
1.	(a) Centriole	(1 mark)
	(b) Cell wall	(1 mark)
2.	Differentiate between osmosis and diffusion.	4 marks)
3.	List three characteristics of the phylum chordata.	(3 marks)
4.	State the products of the light reaction stage of photosynthesis.	(2 marks)
5.	What is meant by the term osmoregulation?	(1 mark)
6.	List three factors that affect the process of active transport.	(3 marks)
7.	Name the organisms that cause the following disease?	(5 marks)
7.	(a) Amoeba dysentery.	(1 mark)
	(b) Typhoid	(1 mark)
8.	Explain the relationship that occurs between the algae and fungi in lichens.	(1 mark)
9.	Explain the relationship that occurs octween the algae and rung in helens. Explain why blood from the alimentary canal, pass through the liver before entering the general circulation?	(2 marks)
	What are the two functions of a pleural membrane that gives the mammal advantage over other organisms?	(2 mark
	Differentiate between interspecific competition and intraspecific competition.	(2 marks)
	Explain why the carrying capacity of wild animals is higher than that of cattle for aunit mass.	(2 marks)
	What happens to excess fatty acids and glycerol after digestion in the body?	(2 marks)
	Removal of the apical bud from the shrub is a practice that results in the development of the lateral buds which l	
14.	branches.	ater form the
(0)	Give two reasons for the development of the lateral branches after the removal of the apical bud.	(2 mortes)
	Suggest two application of this practice.	(2 marks) (2 mark)
	What is the importance of this practice?	(1 mark)
	Give structural differences between the sperm cell and the ovum	(2 marks)
	State how the sperm cell is structurally adapted to its function (3 marks)	(2 marks)
	The diagram below shows the development of an embryo sac during reproduction in plants. Name the structures	Johalad A B
17.	and C.	(3marks)
12	Name two substances that leaves the foetal blood through the placenta	(2marks)
	State two ways in which the aerenchyma tissues in aquatic plants are adapted to their function.	(2marks)
	The diagram below represents a transverse section of an ovary of ascertainflower.	(Ziliaiks)
a)	Name the structures labeled W	(1mark)
b)	Name the type of placentation illustrated in this diagram	(1mark)
c)	Give an example of a plant whose flowers have the following type of placentation.	(1 mark)
	The diagram below represents the nitrogen cycle	(1 mark)
(a)	State the process labeled	(2marks)
	Name the compound represented by B	(1marks)
(c)	Name the group of organisms labeled C	(1marks)
. /	a) State two advantages of metamorphosis to the life of an insect	(2marks)
b)	Explain the roles of the following hormones in growth and development in insects:	(2marks)
i)	Juvenile hormone	(2marks)
	Ecdysone	
	State three factors in the seeds that causes seed dormancy	(3marks)
	(a) Distinguish between continuous variation and discontinuous variation	(2marks)
	Give two examples of continuous variation in humans	(2marks)
	Name two properties of deoxyribonucleic acid	(2marks)
	Name two types of gene mutations	(2marks)
	In a certain variety of cattle some individuals may have red, white or roan (a mixture of white and red) fur color	
27.	between a cow with red fur and a bull with white fur produced a calf with roan fur. Using letter R to represent re	
	W to represent the white colour; Work out the F ₁ generation4marks	
28	State TWO behavioral activities involved in the process of maintaining body temperature	(2 marks)
	Differentiate between diabetes mellitus and diabetes insipidus	(2 marks)
	Define the following terms	(
a)	Allele	(1mark
b)	Heterozygous	(1 mark)
	Explain the process of peristalsis	(2 marks)
	State two ideas proposed by Lamarck	(2 marks)
	1 -r	()

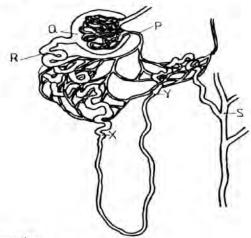
RAISMARADE JOINT EXAMINATIONS COUNCIL

231/2 BIOLOGY Paper 2

2 hours

SECTION A (40 MARKS)

1. The diagram below represents a mammalian nephron.



a) Name the:

Structure labelled P and S

(2marks)

State the structural modifications of the part label led Q for:

(i) Desert mammals

(2marks)

(ii) Fresh water mammals

(2marks)

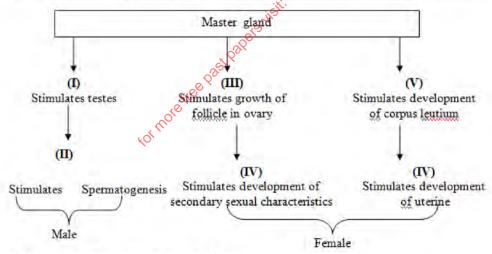
(i) Name one substance present at point R but absent at point sin a healthy mamma

(1mark)

(ii) The appearance of the substance you have named in (c) above is a symptom of a certain disease. Name the disease. (1mark)

wers.com or call. Or 20502 ATS

2. The diagram below represents some hormones, their sources and functions in a mammal:



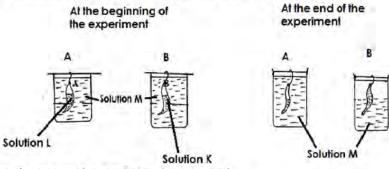
(a) Identify the master gland described above. (1mark)

(b) Name hormones (ii), (iii), (v) and (iv) (4marks) (c) Explain the consequences of deficiencies of hormone (ii) in man. (2marks)

(d) Other than stimulating the development of uterine wall, suggest one other function of hormone (vi)

(lmark)

In an experiment two equal volumes of solution L and M were placed into visking tubing. The visking tubing was suspended into beakers containing equal volumes of solutions K. The set -up is as shown in the diagram A and B. The set-up was allowed to stand for 45minutes and results are as shown in the diagrams.



(a) Name the process that was being demonstrated.

(1mark)

(2marks)

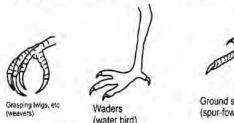
(2marks)

(2marks)

- (b) Explain the results that were obtained at the end of the experiment in
- Set-up A. (i)
- (ii) Set up B. (c) What is the biological importance of the process demonstrated in this experiment to plants?
- (d) What happens to a marine Amoeba when it is transferred from sea water to freshwater?

(1mark)

Study the diagrams below and answer the questions that follow.



Ground scraching (spur-fowl) Webbed (ducks)

What type of evolution is illustrated by the limbs?

(1mark) (1mark)

- What does the origin of the limbs suggest about the ancestry of these animals? b)
- 1) What are vestigial structures?

(1mark) (1mark)

State an example of vestigial structures in humans. ii) What is natural selection?

(1mark)

Give one example of natural selection in action. ii)

(1mark)

Explain comparative serology as an evidence of evolution. e)

- (2marks)
- 5 A farmer crossed a black bull and a white cowand discovered that the resulting calf had black and white spots which were equally distributed. He concluded that the genes for coat colour are co-dominant.
- Using letter B to represent black colour and W for white colour, state the parental genotypes. a)

(1mark)

b) State the genotypes for F₁ calves (1mark)

c) If F₁ offspring were crossed, work out a cross between the F₁ cattle. (4marks)

d) Give the phenotypic ratio of the F_2 cattle.

- (1mark)
- If the farmer wanted white cows only in all generations, select the genotype that he would use in subsequent crosses. (1mark)

SECTION B(40 MARKS)

Answer question 6 (compulsory) in the spaces provided. Answer either question 7 or 8 in the spaces provided after question 8.

The table below represents the increase in the number of yeast cells over a period of 45 minutes 6.

ne table below represents the	nicicasc	III file	munio	ci di yi	casi cci	IIS OVEL	a period	4 VI 72 II	unutes	-
Time in Minutes	0	5	10	15	20	25	30	35	40	45
Number of Veast cells	2	2	4	24	46	84	124	136	140	140

a)

Using the grid provided below, draw a graph of the number of yeast cells against time.

(6marks) (1mark)

ii) Determine the number of yeast cells after 26 minutes. b)

iii) After how long was the population of yeast cells 128? C)

(1mark)

Work out the rate of cell division between the 24th and the 28th minutes. d)

(1mark) (2marks)

Account for the shape of the curve shown:

(4marks)

 Between 0 and 10 minutes. iii) Between 40 and 45 minutes.

i) Name the type of curve shown

a)

- (2marks)
- e) State three factors which would cause human population growth to assume the shape of the curve between 10 and 30 minutes. (3marks)
- a) Name and state the functions of the cellular components of the mammalian blood.

(7marks)

b) Outline the functions of blood plasma in mammals.

(13marks)

Explain five abiotic factors that affect the ecosystem.

(20 marks)

RAISMARADE JOINT EXAMINATION COUNCIL

Kenya Certificate of Secondary Education

231/3

Biology

Paper 3

July/August 2016

(Practical)

CONFIDENTIAL

- Each candidate should have
- 2 clean dry test tubes in a test tube rack
- A boiling tube tube
- 25mls of Bromthymol blue
- 10ml measuring cylinder
- Distilled water in a wash bottle
- Each candidate should have access to
- Dilute Hydrochloric acid
- Dilute Sodium chloride
- Means of heating / water bath
- Atest tube holder
- 10ml of solution X which is calcium hydroxide
 - .-drinking straw
 - 2 droppers

NB To prepare solution or use as PH indicator, dissolve 0.1g o Bromothymol blue powder in 10mls

RAISMARADE JOINT EXAMINATION COUNCIL

Kenya Certificate of Secondary Education

231/3

Biology

Paper 3

July/August 2016

(Practical)

- You are provided with the following:
- 25ml Bromothymol blue.
- Solution X.
- A drinking straw.
- 2 test tubes.
- 10ml measuring cylinder.
- A boiling tube.
- Dilute hydrochloric acid.
- Dilute sodium hydroxide.
- Place 2ml of Bromothymol Blue (B.T.B) in a clean test tube. Add dilute hydrochloric acid drop by drop and shake after each drop till there is a permanent colour change.

State the resulting colour.

(1 mark)

- (ii) To the mixture obtained above, now add sodium hydroxide solution drop by drop until there is a colour change. Record your observation. (1 mark)
- (iii) From your observations in (a)(i) and (a)(ii) above, what is the nature of Bromothymol blue?

(1 mark)

- (b) Place 10ml of fresh Bromothymol blue in a boiling tube. Using the drinking straw, bubble air from your mouth through the bromothymol blue until there occurs colour change.
- Record your observation. (i)

(1 mark)

What does the colour obtained in (b)(i) above suggest about the nature of the gasbreathed out? ii)

(1 mark)

- (c) Rinse the measuring cylinder and use it to place 2ml of solution X in a clean test tube. Rinse the drinking straw used in (b) above and use it to bubble air from your mouths through solution X.
- Record your observation.

(1 mark) (1 mark)

(ii) Suggest the identity of solution X.

iii) Suggest the identity of the gas that gave rise to the observation above. (1 mark)

(1 m)

(d) (i) Name the physiological process in cells that leads to formation of the gas named in c(iii) above.

Page | 196

- (ii) Write down a word equation for the process named in d(i) above.
- (iii) What is the importance of the identified process in cells of living organisms?

(2 marks) (1 mark)

Study the photographs and answer the following questions.







PLATE 7

The photograph in Plate 5 shows the germination process in a species of legume.

(i) Name the type of germination shown in the photograph.

(1 mark) (1 mark)

(ii) Give a reason for your answer.

(2 marks)

(b) (i) Name two roles of cotyledons shown in the photograph.

(ii) State one role of hypocotyl in germination.

(1 mark)

(II) Examine the photograph in Plate 6 and Plate 7 which show different essential parts of a flower of a species on two different plants.

(a) Name the flower parts shown in Plate 6 and Plate 7.

(2 marks)

Plate6 Plate 7

PLATE 5

(b) (i) Name the phenomenon described in the statement above.

(1 mark)

(ii) Give a reason or your answer.

- (c) (i) State the mode of pollination of the flower shown in the photograph. (1 mark)
 - (ii) Give a reason for your answer. (1 mark)
- (d) (i) State the type of pollination of the flower shown in the photograph.
 (ii) Give **one** reason for your answer.
 (1 marks)
- 3. The photographs in Plate **J**, **K** and **L** shows the anterior part of two different animals, Plate **L** shows the longitudinal dissection of Plate **K**. Examine the photographs and answer the questions below.



PLATE J PLATE K



PLATE L

	TENTE E	
(a)	(i) State the class to which the animal organ in Plate J belongs.	(1 mark)
	(ii) State the habitat of the animal	(1 mark)
	(iii) Give a reason for your answer in (ii) above.	(1 mark)
(b)	(i) Name the organ shown in the photograph in Plate J.	(1 mark)
	(ii) State the function of the organ named above (i).	(1 mark)
	(iii) Name the structure that protects the organ named in (b(i) above from mechanical damage.	(1 mark)
	(iv) From observable features only, explain three adaptation of the organ to its function.	(3 marks)
	(c) (i) Identify the structure in the photograph Plate K and L.	(1 mark)
	(ii) Give a reason for your answer.	(1 mark)
	(iii) Using observable features only, state three adaptations of the structure to its functions.	(3 marks)

(3 marks)

(2 marks)

(1 mark)

(1 marks)

(1 mark)

(1 mark)

(1 mark)

(1 mark)

NYERI COUNTY FORM 4 JOINT ASSESSMENT

231/1

BIOLOGY

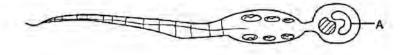
PAPER 1

Time: 2 hours July/ august 2016

Kenya Certificate of Secondary Education

	100		
1.	a)	Name the part of the microscope that is used to;	
	i)	Change from one objective lens to another	(1 mark)
	ii)	Regulate the amount of light to the specimen	(1 mark)
	b)	State two functions of the centrioles.	(2 marks)
2.	a)	Name a physiological process that requires energy to be used for it to take place.	(1 mark)
	b)	State how osmosis can promote support in young non-woody plants.	(1 mark)
3.	a)	Identify the phylum and class to which a scorpion belongs.	(2 marks)
	b)	State two reasons for your answer in b(ii) above.	(2 marks)
4.	Sta	te two physiological changes that take place in the human skin to help in the conservation of the body heat.	(2 marks)

The diagram below shows a human male gamete.



What is the role played by the structure named in (a) above.

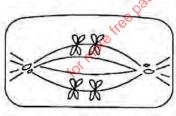
Name the part of the test is in which the above shown gamete is produced ne the type of skeleton found in the following animals;

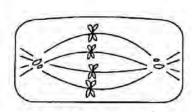
Insects

Earthworms

Humans (1 mark) (2 marks) c) (1 mark)

- Name the type of skeleton found in the following animals;
 - i)
 - ii)
- iii) 7. Distinguish between respiratory quotient and oxygen debt
 - Name the site where anaerobic respiration occurs in a cell. b)
- Where are the light sensitive cells are located in the eve? Define the term visual acuity.
- State one function of each of the following apparatus in the study of living organisms.
 - Sweep net Pooter b. Magnifying lens
- 10. The diagram below represents a stage of cell division.





a	Identify the type of cell division represented by the cells labeled A and B.	(2 marks)
b.	Which stage of cell division is represented by cells A and B?	(2 marks)
11. i)	Name the structure that encloses the heart.	(1 mark)
ii)	State the function of the structure named in a (i) above.	(1 mark)
12. a)	Explain how the following occur during chromosomal mutation;	
i)	Non – disjunction	(1 mark)
ii)	Deletion	(1 mark)

- (1 mark) b) What type of variation is exhibited by the ability to roll the tongue in humans? 13. Form three students wanted to estimate the population of grasshoppers in a grass field near a school compound. They captured 36 grasshoppers and marked them before returning them back to the field. After one day, they made another catch of grasshoppers. They collected 45 grasshoppers of which only 4 had marks.
 - State why the second capture was done after one day. (1 mark)
 - From the data, calculate the population size of grasshoppers in the grass field. (2 marks)

		Biology p1, p2
4.	State two biological significance of dormancy in seeds.	(2 marks)
5.	State two theories advanced to support the origin of life.	(2 marks)
6.	a) Identify the following responses;	
	i) Euglena migrates from a dark place towards light	(1 mark)
	ii) Hairs and leaves of insectivorous plants close rapidly and trap insects when they land on the plants.	(1 mark)
	b) Explain the biological significance of the response named in a(i) above.	(1 mark)
7.	Name the;	Co Today
	Material that strengthens the xylem tissue.	(1 mark)
	b. Tissue that is removed when the bark of a dicotyledonous plant is ringed.	(1 mark)
8	a) State one advantage of heterodonts over homodonts .	(1 mark)
	b) A certain animal was found to have the following number of teeth on the upper jaw.	8
	Six molars, six premolars, no canines and incisors and no the lower jaw.	
	Six molars, six premolars, six incisors ant two canines.	
	i) Write the dental formula of the above animal.	(1 mark)
	ii) What is the likely diet of the animal?	(1 mark)
Q.	a) Name the organelle that performs each of the following functions in a cell.	(Timark)
-	i) Controls movement of substances in and out of the cell.	(1 mark)
	ii) Stores enzymes.	(1 mark)
	b) State two factors which destroy the semi-permeability of the cell membrane.	(2 marks)
ń		(2 marks)
M.	The diagram below shows part of the mainmanarticphrone.	
	The diagram below shows part of the mammalian nephrone. Glomerulus Bowmans capsule proximal convoluted tubule a. Name the vessel labeled L	
	a. Name the vessel labeled L	(1 mark)
	b. Explain the significance of vessel K being wider than the vessel labeled L.	(2 marks)
	 Name the component of the blood that do not form the glorierular filtrate. 	(1 mark)
1.	Name the habitat of the plant that:	
	i) Has stomata on the upper leaf surface only.	(1 mark)
	ii) Has sunken stomatal pores.	(1 mark)
2.	a) Name two water-borne human diseases that are characterized by severe diarrhoea.	(2 marks)
	b) i) Name the ;part of the plant where nitrogen fixation takes place.	(1 mark)
	ii) What is the effect of denitrifying bacteria in the soil?	(1 mark)
3.	The diagram below represents a mammalian bone.	
	Rolling Bast Po	
	a. Identify the bone.	(1 mark)
	b. Name the parts labeled A and B.	(2 marks)
	Thanks has plate about it that D.	(~ marks)
4	Apart from the lungs, name two respiratory surfaces in a mature frog.	(2 marks)
5.		***
		(2 marks)
6	 a) State two advantages of metamorphosis to the life of insects. 	(2 marks)
6.	b) What is the role of air in a germinating seed?	(2 marks)

NYERI COUNTY JOINT ASSESSMENT

BIOLOGY

231/2

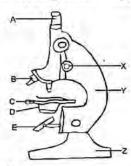
PAPER 2

Kenya Certificate of Secondary Education (K.C.S.E)

SECTION A (40 MARKS)

Answer ALL the questions in this section

1. The figure below is a diagram of a light microscope.



a. Name the parts labeled A - E.

(5 marks)

b. What is the function of the part labeled: D and X

(2 marks)

Give a reason why staining is necessary when preparing specimens for observation under the microscope.

(1 mark)

In a family with four children, the mother had blood group B while the father had blood group A. One of the children had blood group O.

a. i) Work out the blood group of all the children.

(4 marks)

ii) What was the genotype of the child with blood group O?

(1 mark)

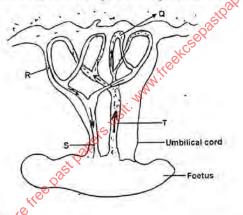
iii) Which child can receive blood from any member of the family? Explain,

(2 marks)

b. What is meant by the term test cross?

(1 mark)

The diagram below represents the structure of part of the placenta and how it is connected to the foetus.



Name the structure S and T.

(2 marks)

b. State one substance which passes in the direction indicated by arrow Q and two substances which pass in the direction indicated by arrow R.

i) Q ii) R (1 mark)

c. The blood of the mother and that of the foetus does not mix. State one advantage of this to the foetus.

(2 marks) (1 mark)

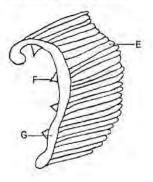
d. i) Name the hormone produced by the structure drawn above.

(1 mark)

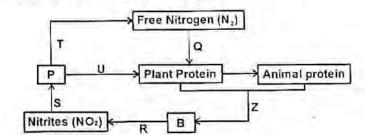
ii) State the role of hormone named in d(i) above.

(1 mark)

The diagram below shows a respiratory surface of an organism.4



		Biology p1, p2&p3
a.	Name the class to which the organism having the respiratory surface belong and state its habitats.	(2 marks)
b.	Circle the letter on the diagram that represents the specific site where gaseous exchange takes place.	(1 mark)
C.	Label parts F and G.	(2 marks)
d.	Name the functions of part labeled G.	(2 marks)
e.	Give a reason why respiratory surfaces are supplied with a dense network of blood capillaries.	(1 mark)
5.	Below is a representation of a biogeochemical cycle.	



a.	Name the above cycle.		(1 mark)
b.	What is B and P?		(2 marks)
C.	Name the microorganism labeled T and R.		(2 marks)
d.	Name process U and Z		(2 marks)
e.	Give specific name of a free living bacteria in the biogeochemical cycle.	100	(1 mark)

SECTION B

Question 6 is a compulsory question. Choose one question between 7 and 8

COMPULSORY QUESTION

COMPULSORY QUESTION

The table below shows figures of heat production and heat loss by a naked human being and how they vary with the surrounding air temperature.

Air temperature (°C)	0	5	10	15000	20	25	30	35	40
Heat production (J/hr)	1420	1060	800	600	480	380	320	290	280
Heat loss (J/hr)			co	140	200	280	400	540	840

	Q ^O	
a.	On the same axes, draw graphs of heat production (J/hr) and heat loss (J/hr) against air temperature °C.	(7 marks)
b.	At what air temperature does the body lose as much heat as it produces?	(1 mark)
C.	i) Explain the relationship between heat loss and heat production at 40°C.	(3 marks)
	ii) Explain the fact that readings for this experiment were not taken for air temperature above 40°C.	(2 marks)
d.	Explain how blood vessels in the skin helps the body to lose excess heat.	(4 marks)
c.	State three adaptive features which mammals that live in very cold region have.	(3 marks)
7,	 a) Distinguish between nervous and endocrine communication in animals. 	(5 marks)
	b) Describe the functions of the different parts of the mammalian eye.	(15 marks)
8.	a) Describe how the mammalian blood protects the body.	(9 marks)
	b) Describe how environmental factors increase the rate of transpiration in terrestrial plants.	(11 marks)

NYERI COUNTY JOINT ASSESSMENT

BIOLOGY

231/3

PAPER 3

PRACTICAL

Confidential

Requirements:

- Ripe orange labelled specimen K
- Scalpel blade
- 3. Benedict's solution
- 5% sodium hydroxide
- 5. 1% copper (II) sulphate
- Iodine solution 6.
- 7. DCPIP
- 8. 4 test tubes
- 9. Bunsen burner or any means of heating
- 10. Test tube holder
- 11. Transparent ruler
- 12. 100ml beaker
- 13. 5 droppers

NYERI COUNTY JOINT ASSESSMENT

BIOLOGY

231/3

PAPER 3

PRACTICAL

Cut a transverse section of specimen K and draw a well labeled diagram of the section.

(3 marks)

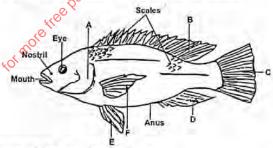
ii) State the placentation of the specimen K.

(1 mark) b) Squeeze the juice from specimen K in a beaker. Using the reagents provided carry out food test to determine the food substances present in specimen K. Record the food substances tested, procedures, observation and conclusion in the table below. (12 marks)

Food substance	Procedure	Observation	Conclusion
	a's		

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Study the diagram shown below and answer the questions that follow.



Name the phylum to which the specimen belongs. (1 mark) 1) a.

ii) State the class to which the organism belongs and give two reasons. (1 mark)

What term is used to describe the body shape of the organism in photograph/diagram below. (1 mark) b.

i) Name the parts labeled A and B. (2 marks)

ii) State the function of the parts labeled Cand D. (2 marks) Using observable features from the diagram, state two adaptations of the organisms to locomotion in water. d.

(2 marks)

Calculate the tail power of the organism. (2 marks) e.

The length of the actual fish from which diagram was obtained measured 20cm. Calculate the magnification of the diagram.

(2 marks)

MAARA SUB-COUNTY FORM 4 JOINT EXAMINATIONS

Kenya Certificate of Secondary Education

231/1

BIOLOGY

Paper 1

(Theory)

July/August 2016

Time: 2 Hours

1. State of	ne use for each	h of the following	g apparatus in the	study of living things.
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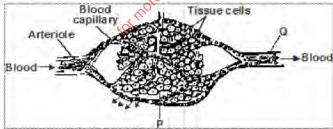
a) Pooter	(1 mark)
b) Pitfall trap	(1 mark)
State the necessity of classifying living things in Biology.	(2 marks)

- 3. Give a reason in each case of the following treatment in preparation of temporary slides in Biology.
 - a) Staining (1 mark)
 - b) Cutting thin plant sections (1 mark)
- 4. a) Name the class in the phylum Arthropoda with the largest number of individuals. (1 mark)
 b) Besides abdomen, name the other part of members of Arachnida. (1 mark)
- 5. How do the following factors affect the rate of diffusion?
 - a) Diffusion gradient (1 mark)
- b) Surface area to volume ratio (1 mark)
- 6. State two functions of cell sap. (2 marks)7. How is the epidermis of a leaf of a green plant adapted to its function. (2 marks)
- 8. The number of stomata on the lower and upper surfaces of two leaves from plant species X and Y were counted under the filed of view of a light microscope. The results were as shown on the table below.

Leaf	Number of stomats		
Les	Upper surface	Lowersurface	
х	4	12	
Y	20	23	

- a) Which of the two leaves would be expected to have a lower rate of transpiration? (1 mark)
- b) Give a reason for your answer in (a) above. (1 mark)
- 9. Explain how carnassial teeth of a dog are adapted to their function. (2 marks)
- 10. State the role of iron in the human body. (1 mark)
- 11. a) Name the external feature that is common in birds, fish and reptiles. (1 mark)
- b) State two characteristics of fungi. (2 marks)
- 12. Why would carboxyhaemoglobin lead to death. (2 marks)
- 13. Construct a one-step dichotomous key using two leaves one with a serrated (A) and one with a smooth margin (B)(2 marks)
- 14. a) Name the part of a microscope used to bring the image of a specimen into sharp focus. (1 mark)
- 15. State two ways in which some fungi are harmful to man. (2 marks)
- 16. The diagram below shows blood circulation in a mammalian tissue.

b) Why is it recommended to keep the stage of the microscope dry.



- a) Name the parts labelled P and Q (2 marks)
 - b) Name the substances that are:
 - i) Required for respiration that move out of capillaries. (1 mark)
 - ii) Removed from tissue cells as a result of respiration. (1 mark)
 - c) Explain how substances move from blood capillaries into the tissue cells. (3 marks)
- 17. Name the organelle that is involved in each of the following:
 - a) Manufacture of lipids (1 mark)
 - b) Formation of lysosomes (1 mark)
- 18. What osmoregulatory changes would take place in a marine amoeba if it was transferred to a fresh water environment?
- (4 marks)
- 19. a) Name the group of bacteria found in root nodules of leguminous plants. (1 mark)
 - What is the role of the bacteria named in (a) above. (1 mark)

(1 mark)

20. State four applications of plant hormones in agriculture.

(4 marks)

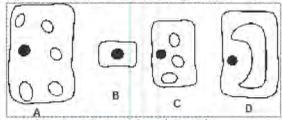
21. Describe the mechanism of gaseous exchange in plants through the lenticels.

(4 marks)

(1 mark)

(3 marks)

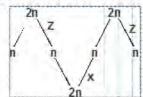
22. The following cells are found at different regions of the apical meristems. Use them to answer the questions that follow.



- a) Rearrange them into three regions. (1 mark)
 - zone of cell division

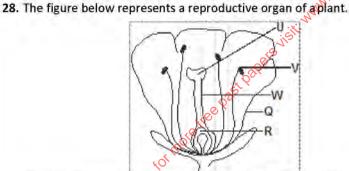
29

- zone of cell elongation
- zone of cell differentiation
- b) Name three specialised tissues formed at the zone of cell differentiation. (3 marks)
- 23. The chart below shows the number of chromosomes before and after cell division and fertilisation in a mammal.



	a)	What type of cell division takes place at Z.	(1 mark)
	b)	Where in the body of a female does process X occur?	(1 mark)
	c)	On the chart, indicate the position of parents and gametes.	(2 marks)
24.	a)	What is meant by convergent evolution ?	(1 mark)
	b)	State two limitations of fossils as an evidence of evolution.	(2 marks)
25	. Sta	ite three ways in which support is brought about in a leaf.	(3 marks)
26.	a)	State the importance of divergent evolution to organisms.	(2 marks)
	b)	State the evidence of evolution based on cell organelles.	(1 mark)

b) State three benefits of polyploidy in plants to a farmer.



27. a) Name the process that leads to addition or loss of one or more chromosomes.

a)	Which letter represents the structure that produces female gametes?	(1 mark)
b)	Name the structure labelled W. (1 mark)	
c)	Which letter represents the structure where fertilization takes place?	(1 mark)
d)	Which letter represents the structure where male gametes are produced?	(1 mark)
9. W	hat is meant by the terms:	
		12

a)	Protogyny	(1 mark)
b)	Self sterility	(1 mark)

MAARA SUB -COUNTY FORM 4 JOINT EXAMINATION

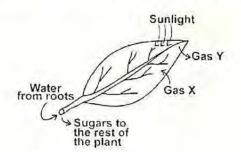
231/2

BIOLOGY

PAPER 2

July/august 2016

Leaves are the organs of photosynthesis. The following diagram shows what happens in a plant leaf during photosynthesis.



a)	Give two ways in which leaves are adapted to absorb light.	2mks
b)	Name the gases labeled X and Y	2mks
c)	Explain why it is an advantage for plant to store carbohydrates in form of starch rather than as sugar.	2mks
d)	Describe what happens during dark stage of photosynthesis.	2mks
2.	The diagram shows a set up to investigate anaerobic respiration in germinating bean seed.	

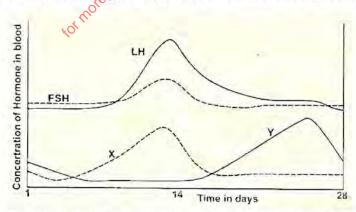
Pyrogalic acid

Germinating beans

Water (35%) Company of the second of

a)	What is the purpose of the pyrogallic acid?	1mk
b)	State the importance of the water bath in the experiment.	1mk
c)	Write a word equation for anaerobic respiration taking place in the germinating beans.	1mk
d)	Explain why plants can only respire anaerobically for a short period of time.	1mk
e)	What would be product if the process was taking place in animal muscle?	1mk
f)	Distinguish between obligate and facultative Anaerobes.	2mks
g)	Name the site for anaerobic respiration in a cell.	1mk

The figure below shows the changes in blood level of hormones that takes during the menstrual cycle in a human female.

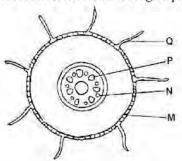


	a)	Name the hormones whose concentration arte represented by curves X and Y.	2mks
	b)	State two effects of the hormone X during the menstrual cycle.	2mks
	c)	Explain the role of FSH in female reproduction.	2mks
	d)	What is the role of a high concentration of luteinizing hormone?	1mk
	e)	State the fertile period during the menstrual cycle.	1mk
4.	a)	Name two disorders in human caused by gene mutation.	2mks
	-1.7	Describe the following chromosomal mutations	

- i) Inversion
- ii) Translocation
- c) In Mice the allele for black fur is dominant to the allele for brown fur. What percentage offspring would have brown fur from a cross between heterozygous b lack mice? Show your working Use letter B to represent the allele for black colour.

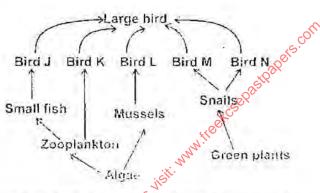
4mk

5. The diagram below represents a transverse section through a plant organ.



a)	From which plant organ was this section obtained?		1mk
b)	Give two reasons for your answer in (a) above.		2mks
c)	Name the parts labeled M, N, P	10	3mks
d)	State two functions of the part labeled Q?	. Par	2mks
	Section B		

6. After an ecological study of feeding relationship students constructed the food webbelow?



		and the second s	
	a)	Name the process through which energy from the sun is incorporated into the food web.	1mk
	b)	State the mode of feeding of the birds in the food web.	1mk
	c)	Name two ecosystems in which the organisms in the food web live.	2mks
	d)	From the information in the food web, construct a food chain with the large bird as a quaternary consumer.	Imk
	e)	What would happen to the organism in the food web if bird N migrated?	1mk
	f)	Not all the energy from one trophic level is available to the next level. Explain.	3mks
	g)	i) Two organisms which play a role in the ecosystem are not included in the food web. Name them.	3mks
		ii) State the role played by the organisms named in g (i) above.	1mk
	h)	i) State three human activities that would affect the ecosystems.	3mks
7.	Ho	w is the human eyeball adapted to its function?	20mks
8.	Des	scribe how human kidney functions.	20mks

	MERU SOUTH FORM 4 JOINT EVALUATION 231/1	
	BIOLOGY	
	PAPER 1	
	July / august 2016	
1.	Name two antigens that determine human blood groups.	2mks
2.	State three traits common in insects and millipede that lead to classification in phylum arthropoda.	3mks
3.	What is the importance of the following in an ecosystem?	
	i) Bacteria and fungi	1 mk
	ii) Predators	1mk
4.	 a) What is the role of centractile vacuole found in aquatic micro-organisms. 	lmk
	 b) Give two structural modifications of nephrons in kidney of desert animal. 	2mks
	 Name the hormone responsible for the re-absorption of water in animals. 	1 mk
5.	State the biological significance of each of the following in the digestive system	3mks
	i) Breakdown of food into smaller particles	
	ii) Presence of caecum in herbivores	
	iii) Long small intestines in man	
6.	Name two vestigial structures in man.	2mks
7.	a) Define a cell.	l mk
	b) State two functions of the cell membrane.	2mks
8. 1	Name the types of response described in each of the following cases	3mks
	b) State two functions of the cell membrane. Name the types of response described in each of the following cases a) Twinning of plant leaf tendrils on an object. b) Euglena swimming towards source of light. c) Sperms swimming towards ovum during fertilization. Name the structure formed by the following parts affect fertilization in a flower. i) Polar nuclei ii) Egg iii) Intergument Study the diagram below and answer question that follow.	
	b) Euglena swimming towards source of light.	
	c) Sperms swimming towards ovum during fertilization.	
9.	Name the structure formed by the following parts affect fertilization in a flower.	3mks
	i) Polar nuclei	
	ii) Egg	
	iii) Intergument	
10.	Study the diagram below and answer question that follow.	
	Epidermis	
	a) Identify the structures shown in figure above.	1mk
	a) Identify the structures shown in agure above. b) Identify 3mks i) Part B ii) Part C	THIK
	3mks	
	i) Part B	
	ii) Part C	
	iii) Gas X	
11.	Give examples of genetic disorders caused by:	
	a) i) Non-disjunction	1mk
	ii) Gene mutation	2mks
	b) Define the term test cross as used in genetics.	1mk
12.	. Diagram below represents a type of muscle.	
		5-2
	 a) Identify the type of muscle shown above. 	1mk
	b) Name two parts of human body where this type of muscle can be found.	2mks
13	. a) What is oxygen debt?	1mk
200	b) How is oxygen debt paid back?	1mk
	N TO STAND AND A STAND STAND STAND STAND STANDS	2 0003

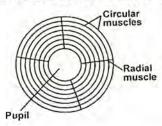
1mk

2mks

1mk

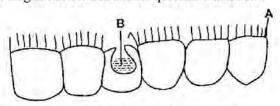
3mks

14. Diagram below shows a section of the iris of the eye, when in bright light.



- 3	 State the changes that occur in the iris when one moves from sun and enters a dark room. 	3mks
	b) What is the significance of the charges in(a) above.	1mk
	Differentiate between the terms haemolysis and plasmolysis.	2mks
. 1	What is the rate of the following in germinating seed?	
	i) Oxygen	1mk

ii) Cotyledons17. Study the diagram below and answer question that follow.



i) Epithelial layer above is located in the nasal cavity.

Name the structure labeled A and B

ii) State the significance of the structure A.

18. Name the glands that secrete the following hormones.a) Insulin

b) Thyroxinec) Adrenaline

15. 16.

19. State two roles of saliva in the mouth.

20. The diagram below shows longitudinal section through a digotyledonous root.



i) Name the part of the epidermis which bear the root hair
ii) Name the group of cells found in the region labeled C,
iii) State the role of part Labeled D in germination.

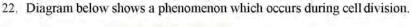
21. a) Identify the biotic relationship between

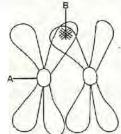
1mk
2mks

i) Lizards and grasshoppers

ii) Cheetahs and Leopards

b) Give two reasons why primary productivity in aquatic ecosystem decreases with depth. 2mks





	i)	Name part labeled B	1mk
	ii)	State biological importance of part B	lmk
	iii)	Name the stage of cell division where above phenomenon occurs.	1mk
23.	a)	Name the type of cells found cortex of plant stems.	1mk

	Biology p1, p2&p3
b) State two functions of cell sap.	2mks
24. Name two classes of phylum chordate whose members are poikilothermic.	2mks
25. Name two parts of human body where red blood cells are produced.	2mks
26. State the type of placentation found din the following fruits.	3mks
i) Pawpaw	
ii) Orange	
iii) Bean pod	
27. Name two regions in human body that displays counter-current flow system.	2mks
28. State the use of bait trap apparatus in field study.	1mk



MERU SOUTH FORM 4 JOINT EVALUATION

231/2

BIOLOGY

PAPER 2

July / august 2016

. The diagram below illustrates various types of blood cells







a)	Name the blood cells represented by K, L, M.	3mks
b)	Give one main feature that is present in cell L and absent in cell K.	1mk
c)	Give a reason for the absence of the structure you have named in b above in cell k.	1mk
d)	Highlight one way by which cell L performs its functions.	1mk
e)	Which occurrence prompts the use of cell M in the body?	Imk
f)	Name a vitamin that is very necessary for the functioning of a cell M.	1mk

2. When the offspring of purple and white flowered pea plants were crossed, they produced purple and white flowered plants in the Ratio 3:1. Using letter H to represent the gene for purple colour

a) State the genotype of:

i) Parentsii) F1 generation.

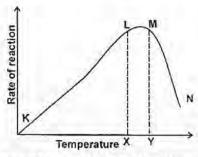
Work out the cross between plants in the F1 generation.

c) Account for the colour of the flower in plants of the F1 generation.

or call. of

2mks 1mk 4mks 1mk

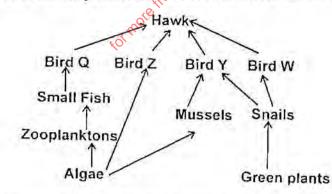
Study the illustration below and answer the question that follow.



a) Explain the rate of reaction between points

i) K-L
ii) L-M
iii) M-N
b) Other than temperature, name two other factors that affect the rate of enzymatic reacstions.2mks

4.



Name the process through which from the sun is incorporated into the food web. 1mk a) b) Construct a food chain with the hawk as the secondary consumer. 1mk Name the two ecosystems in which the organisms in the food web live. 2mks c) Not all energy from one trophic level is available to the next level. Explain. 2mks d) State the mode of feeding of the birds in the food web. 1mk e) f) Name one human active to that would affect the ecosystem. 1mk

 a) i) Explain the changes that take place in the pupil and iris of a human eye when a person moves from a dark room with bright light.

ii) What is the significance of the changes explained in a(i) above.

1mk

b) Explain why images that form on the blind spot are not perceived.

2mks

c) State two traits of the image formed on the retina.

2mks

6. During germination and growth of a cereal the dry weight of endosperm, embryo and total dry weight were determined at two days intervals. The results are shown below.

Time after planting	dry weight of	dry weight of embryo	total dry weight
days	Endosperm(mg)	(mg)	(mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

- a) Using the same axes draw graphs of dry weight of endosperm embryo and the total dry weight.7mks
- b) What is the dry weight on day 5?
- c) Account for
- i) Decrease in dry weight of endosperm from day 0 to 10.
- ii) Increase in dry weight of embryo from day 0 to 10.
- iii) Decrease in total dry weight after day 8.
- iv) Increase in total dry weight after day 8.

 2mks

 2mks
- d) State one factor that cause seed dormancy.
- i) State one factor that cause seed dormancy
- i) Within the seedii) Outside the seed.
- 7. Describe how water moves from the soil to the leaves in a tree.
- 8. a) Name three types of skeletons found in multicellular animals
 - b) Describe how the cervical, lumbar and sacral vertebrae are suited to their functions. 17mks

MERU SOUTH FORM 4 JOINT EVALUATION

Kenya Certificate of Secondary Education (K.C.S.E)

CONFIDENTIAL INSTRUCTIONS

BIOLOGY (231/3)

Paper 3

Each candidate will require

- 1. 1ml of 0.5% starch solution labelled "Solution L₁"
- 2. 1ml of 10% diastase solution labelled "Solution L2"
- 3. 1ml of 10% diastase solution boiled for 15 minutes labelled "Solution L₃"
- 4. Dropper
- 5. 1 white tile
- 6. 3 (three) clean test tube
- 7. Labels (3 pieces)
- 8. Thermometer
- 9. Stop watch/clock
- 10. 250ml beaker
- 11. Access to Hot water (about 100ml for each student)
- 12. Access to iodine solution

MERU SOUTH FORM 4 JOINT EVALUATION

231/3

BIOLOGY

PAPER 3

July / august 2016

1. You are provided with solution labeled L1, L2, L3.

L3 Is the same as L2 except that L3 has been boiled.

Label three test tubes A, B, and C

- Into the test tube labeled A add 1ml of solution L1.
- Into the test tube labeled B add 1ml of L1 and 1ml of L2.
- Into the test tube labeled C add 1ml of LI and 1ml of L3
- Withdraw a drop from test tube A and place it on a white tile. To the drop add one drop of iodine solution record your observations.

Test tube	OBSERVATION	CONCLUSION	
A			
В			
С			

Repeat the procedure with contents in test tube B and C. Record your observation in the table.

Place the three test tubes labeled A, B, C into a water bath at 37°C

Ensure that the temperature of the water does not fall below 35° or exceed 38°. Leave the set up for about 30 minutes

b) After 30 minutes, test the contents of each of the test tubes labeled A, B, and C following the procedure in a above.

Record your observations.

3mks

Test tube	OBSERVATION	CONCLUSION
A		al Co
В		
C		C.CO.

c) Account for the results at the end of the experiment in the test tube labeled B and C.

3mks

d) i) Suggest the identity of solution L2.

1mk

ii) Give two reasons for your answer in d (i) above.

2mks

iii) Suggest where the process being investigated in this experiment would take place in an organism.

1mk

You are provided with photographs of specimens labeled Jp 12, K1 and K2. Examine them.







a)	With a reasons name the classes to which specimen J1, J2, K1 and K2 belong.	4mks
41.4		

Name the part labeled X in specimen J1. lmk What is the importance of the curvature? 1mk

iii) Na\me the part that protects the plumule in specimen K1 and K2 Imk

A group of form three students obtained some leaves of the same size from one plant and took them to the laboratory to analyze the distribution the distribution of stomata on the lower and upper epidermis by observing them under the microscope.

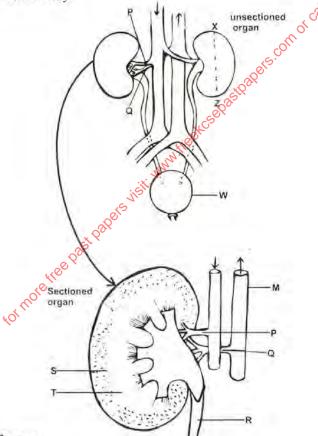
The table below shows the results.

Field of view	Number of stomata Lower epidermis	Upper epidermis		
Ī.	39	21		
2	36	18		
3	24	12		
Average number of stomata		1 1		

Work pout the average number and upper epidermis to complete the table of the. 2mks

Account for the average number of stomata on each of the leaf Upper epidermis 3mks Lower epidermis 2mks

The diagram below shows a pair of mammalian organs with their blood supply. One of the organs has been sectioned longitudinally. Examine them keenly.



a)	Identify the pairs of organs	lmk
b)	State two main functions of the organs	2mks

Name the blood vessel labeled M and Q 2mks

Name the parts (region) labeled S and t 2mks Which part of the Nephron is found in region S and T. 2mks e)

State the function of the structure labeled É and W. f) 2mks

If the actual longitudinal length (X-Z) of the un sectional organ is 9cm, calculate the magnification of the drawing.

2mks

h) Give a reason why vessel P carries a higher concentration of urea thanvessel Q.

1mk

KIGUMO SUB-COUNTY CLUSTER EXAM 2016

Kenya Certificate of Secondary Education (K.C.S.E)

233/1

BIOLOGY

PAPER 1 (THEORY)

JULY/AUGUST 2016

TIME: 2 HOURS

Answer ALL questions

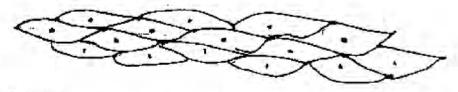
a) State two hormones concerned with blood sugar regulations.

(2 marks)

b) Name the organ where sugar regulation occur.

(1 mark)

The figure below illustrate specialised cells in an animal.



(1 mark) a) Identify the cells. b) Name three organs systems where the cells named in (a) above are found.

Name the photoreceptor cells in retina that respond to

(3 marks)

(i) Dim light

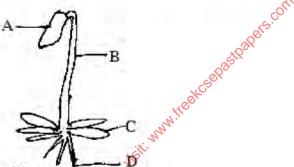
(ii) Bright light

(2 marks

Name three classes in animals that excrete nitrogenous water in form of uric acid.

(3 marks).

5. Study the diagram below.



a) Name the parts A. B and C.	(3 marks)
b) Name the division to which the organism belong.	(1 mark)
c) State two roles of the structure labelled D.	(2 marks)
. A plant cell was put in highly concentrated salt solution for five hours.	

6. a) Describe what happened to the cell.

(3 marks)

b) What term is used to describe such a cell? Diagram below shows eye defect being corrected. (1 mark)

a) Identify the defect. b) Name type of lens used in the correction.

(1mark) (1 mark)

c) Where was image formed in the eye before the correction of the defect?

(1 mark)

A blood group A mother gave birth to a blood group O child with a blood group Bhusband. a) State the genotypes of the parents.

(2 marks)

b) What was the genotype of the child? c) State other blood groups likely to occur in the children of the couple. (1 mark) (1mark)

Define the following terms as used in ecology

iii) Carrying capacity

(1 mark)

i) Population ii) Community

(1 mark) (1 mark)

iv) Ecosystem Distinguish between monoecious and dioecious conditions in plants giving examples. (1 mark)

(4 marks)

11. The experiment below was set up to show respiration. Some glucose was boiled and then cooled, yeast cells were put in and oil added. A thermometer was inserted and a delivery tube connected leading to some calcium hydroxide as shown

a) State three observations that will be made after 30 minutes.
or transfer to the first of the

(3marks)

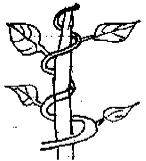
b) Why was glucose solution cooled before adding yeast? c) Why was glucose solution cooled before adding yeast? (I mark) (1 mark)

12. a) Distinguish open and closed circulatory system. Describe the functions of vascular cambium in secondary growth.

(Imark) (3marks)

- State three differences between red blood cells and white blood cells.Diagram shows stem of passion twinning round a post.

(3 marks)



17. 18. 19. 20. 21. 22. 23. 24.	a) What is the biological importance of the twinning growth? b) Explain the twinning growth pattern. c) Identify the response shown. d) Name the structure produced by shoots of some plants that also twine around objects. State function of fine adjustment knob of a light microscope. Name three digestive enzymes found in pancreatic juice. State the function of the lacteal in villi. List two characteristics of members of class Arachnida. Explain three characteristics of gaseous exchange sites. What is the role of companion cell in phloem? List three structural differences between arteries and veins. Explain process of inhalation in man. Explain how hair in man helps to keep the body warm. Name the causative agent of	(2 marks) (3 marks) (1 mark) (1 mark) (2 marks) (3 marks) (1 mark) (2 marks) (3 marks) (2 marks) (3 marks) (4 marks) (4 marks) (2 marks)
26.	i) Typhoid ii) Syphilis Name the type of placentation found in the pawpaw.	(2 marks) (1 mark)
	Name three digestive enzymes found in pancreatic juice. State the function of the lacteal in villi. List two characteristics of members of class Arachnida. Explain three characteristics of gaseous exchange sites. What is the role of companion cell in phloem? List three structural differences between arteries and veins. Explain process of inhalation in man. Explain how hair in man helps to keep the body warm. Name the causative agent of i) Typhoid ii) Syphilis Name the type of placentation found in the pawpaw.	

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KIGUMO SUB-COUNTY CLUSTER EXAM 2016

Kenya Certificate of Secondary Education (K.C.S.E)

233/2

BIOLOGY

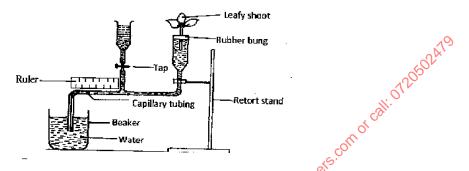
PAPER 2 (THEORY) JULY/AUGUST 2016

TIME: 2 HOURS

SECTION A

ANSWER ALL QUESTIONS

- 1. A cross between a red forward and white flowered plant produce plants with flowers having red and white patches.
 - a) What phenomenon is represented by this condition? (1mk)
 - b) Work out a cross between the F1 plants. (4mks)
 - c) State the phenotypic ratio of F2 plants. (1mk)
 - d) State the genotypic ratio of F2 plants. (1mk)
 - e) Name the a characteristic in human beings that is controlled by multiple alleles. (1mk)
- 2. A set up was used to investigate a certain process in plants is shown in the diagram below;



a) Name the apparatus (1mk)

b) What process was being investigated. (1mk)

c i) State **two** precautions that should be taken when setting up the experiment. (2mks)

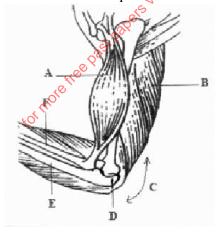
ii) Give a reason for each precaution stated in c (i) above. (2mks)

d) State the effect of placing the apparatus shown in areas with the following environmental conditions,

(i) windy \sqrt{n} (1mk)

ii) low atmospheric pressure (1mk)

3. Study the diagram below and answer the questions which follows.



a) Identify the muscle represented by letter;

A (1 mk) B (1 mk)

ii) Describe how muscles A and B cause straightening of joint C. (2mks)

b) Name the joint C. (1mk)

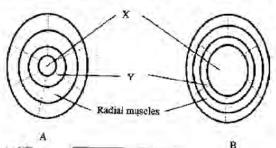
c) Name parts labelled

D (1mk)

E (1mk)

F (1mk)

The diagram below shows how the iris and pupil of human eye appear under different conditions.



a) Name the structures labelled.

X (1mk)

Y (1mk)

b) i) State the condition that lead to the change in appearance shown in the diagram labelled B. (Imk)

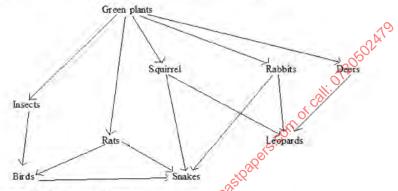
ii) Describe the changes that lad to the appearance of the iris and pupil as shown in the diagram labelled B.

(4mks)

iii) What is the significance of the changes described in b (ii) above.

(1mk)

The diagram below represents a food web from lake Nakuru National Park.



a) i) Identify the organism with the largest biomass.

(Imk)

ii) Give a reason for your answer in 5a (i) above.

(Imk)

b) From the food web, isolate a food chain ending with spakes as tertiary consumers.

(lmk)

c) i) Name any two organisms not shown in the food web but would be present in the ecosystem.

(2 mks)

ii) What is the role of the organisms stated in c (i) above?

(lmk) (lmk)

d) From the food web, snakes and leopards feed on rabbits. What name is given to this kind of competition?

e) From the food web, name an organism that may be both a secondary and a tertiary consumer.

(1mk)

Section B (40 marks)

Answer question 6 (compulsory) and either question 7 or 8.

In an experiment to investigate a certain process in a given plant species, the rate of carbon (IV) oxide consumption and the rate of carbon (IV) oxide release were measured over a period of time for the day. The results of the investigation are as shown in the table below.

Time of the day (Hrs)	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00
CO ₂ consumption mm ³ /min	0	43	69	91	91	50	13	0	0	0
CO ₂ release mm	38	22	10	3	3	6	31	48	48	48

- a) Using the grid provided and on the same axes, draw the graphs of volume of carbon (IV) oxide consumed and carbon (IV) oxide released against time. (7 marks)
- b) Name the biochemical process represented by:

i) Carbon (IV) oxide consumption. (lmk) ii) Carbon (IV) oxide release (lmk)

c) Account for the shape of the curve for

(3mks)

i) Carbon (IV) oxide consumption.

(3mks)

ii) Carbon (IV) oxide release. d) i) From the graph state the time of the day when the plant attains compensation point.

(lmk)

ii) What is meant by compensation point. e) Explain how temperature affect, the rate of carbon (IV) oxide consumption is a plant.

(lmk) (3mks)

Describe how the mammalian kidney functions.

(20mks)

a) Define the term "pollination"

(2mks)

b) Discuss the sequence of events that take place from the time a pollen grain falls on the stigma until a seed is formed.

KIGUMO SUB-COUNTY CLUSTER EXAM 2016

Kenya Certificate of Secondary Education (K.C.S.E)

233/3

BIOLOGY

PAPER 2 (PRACTICAL)

JULY/AUGUST 2016

CONFIDENTIAL

Iodine solution labelled P

Benedict"s solution labelled Q

DCPIP labeled S

2% Sodium hydroxide labelled S

1% Copper (II) sulphate labeled T

Solution K

NB: Solution K is prepared by mixing 10g of maize flour, 5ml of pineapple juice in 100ml of distilled water for 10 student. For more than 10 students, use the ratios to prepare solution for your students

- 4 clean test tubes in a test tube rack
- Dropper
- Source of heat
- 1, a) You are provided with:

P - Iodine

Q - Benedict"s solution

R - DCPIP

S - Sodium hydroxide

T - Copper (II) Sulphate

Use the reagents to identify the food substance (s) in solution K.

(12mks)

Food	Procedure	Observations	Conclusion
		cour	T T T

b) Name the end products of digestion of food substance (s) present in solution K.

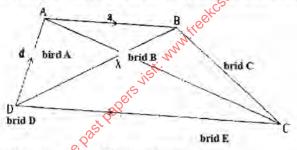
(1mk)

c) Describe the assimilation of food substance (s) identified in 2 (a) above.

(2mks)

2. a) The figure below shows feet of various birds. Study the diagram and answer thequestions that

follow,



i) Name the type of evolution represented by the diagrams.

(1mk)

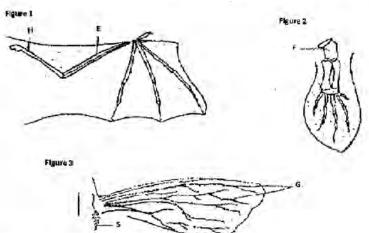
ii) Using Darwin's theory of exclution, explain how the feet of bird E would have evolved.

(3mks)

iii) Explain how Larmack could have explained the evolution of feet of bird C.

(3mks)

b) Figure 1 represents a bat wing, figure 2 a whale paddle and figure 3 an insect wind. Study the diagrams and answer the questions that follow.



i) Name parts labeled E and F.

(2mks)

ii) State one different between the wings in figure 1 and 3.

(lmk)

iii) Name the type of joint found at proximal end of bone marked H.

(1mk)

The photographs R, R1 and R2; S, S1 and S2; T, T1 and T2 below are of seedlings at different stages of germination. Examine them.



a) With a reason, name the class to which specimens R, S and T belong.	6mks)
b i) Name the curved parts labeled X and Y.	

(2mks ii) What is the importance of the curvature in specimen R and T. (1mk) c) Name the part that protects the plumule in specimen S.

(1mk) d) i) Which of the seedlings may form swellings on the roots later in their life?

(1mk) ii) What is the name of the swellings?

(1mk) iii) Name the organisms that are found in the swellings. (1mk)

iv) State the role played by the organisms you have named in d(iii) above. (1mk)

KIGUMO SUB-COUNTY CLUSTER EXAM 2016

Kenya Certificate of Secondary Education (K.C.S.E)

233/3

BIOLOGY

PAPER 2 (PRACTICAL)

JULY/AUGUST 2016

1. a)

Food	Procedure	Observation	Conclusion
Starch	Add a few drops of iodine solution /p to solution K/food substance	Blue black / blue / black colour	Starch present
Reducing sugar	Add a few drops of Benedict's solution to solution K / food substance and warm / heat/boil	Green yellow / Orange / brown precipitate	Reducing sugars present
Proteins	Add a few drops of sodium hydroxide followed by a few drops of copper (II) sulphate to solution K / food substance	No observation Colour change	Proteins absent
Vitamin C / Ascorbic acid	Put a few drops of DCPIP into a test tube. Add a few drops of solution K/ food substance	DCPIP is decolourised	Vitamin C / ascorbic acid present

- b) Glucose:
- Glucose Energy production (cell respiration)

Vitamin C - Healing of wounds /gums prevents scurry

- Divergent evolution; 2. a)
 - Small variations occurred in feet of birds within the population; competition for limited food occurred in the environment; predation as a mode of feeding fayoured birds whose feet had long, sharp and curved claws / tear flesh of prey.
 - iii) All birds had same length of feet; the aquatic environment favoured long feet talons; leading to continuous nature use of feet; which kept increasing in length; the longer trait was then passed on to offspring along the generations.
 - i) E - radius :
 - F Humerus;
 - Fig 1 iii)

Have pentadactyl limb structure

Originate from endoskelefon

Have no pentadactyl limb structure

Originate from exoskeleton

- iii) Ball and socket joint : «
- R Dicotyledonae

Reason - Network venation / reticulate venation / two cotyledons / tap root system

S - Monocotyledonae

Reason - Parallel venation; fibrous root system

T - Dicotyledonae

Reason - Network venation / reticulate venation / two cotyledons / tap root system

- X Epicotyl
 - Y Hypocotyl
 - ii) Protects the growing point / first leaves of the plumule / shoot tip.
- Coleoptile / Plumule sheath c)
- R and T d) i)
 - Root nodules ii)
 - iii) Rhizobium bacteria
 - iv) Nitrogen fixation

MURANG'A SOUTH MULTILATERAL EXAMINATION 2016

Kenya Certificate of Secondary Education (K.C.S.E)

231/1

b)

BIOLOGY

PAPER1 (THEORY)

JULY / AUGUST 2016

TIME: 2 HOURS

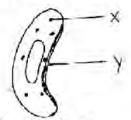
SECTION A (40 marks)

Answer all questions in the spaces provided

1. The diagram below represents a guard cell

a) Name the parts labeled X and Y.

(2mks)



b) State the role of the cell

(lmk)

- a) Koimbi school biology student observed a field of view of 2mm radius when using the medium power objective lens of a microscope to observe onion epidermal cells. Calculate the area of the field of view in micrometers. (1mm = 1000mm)
 - b) What is the average size of the cell in micrometers

State one characteristics of the site named in (a) above.

(2mks) (2mks)

a) Name the site of gaseous exchange in mammals.

(lmk) (lmk)

Outlinetworolesofactivetransportinhumanbeings.

- (2marks)
- 5. Two equal strips A and B were from a potato whose cell was 30% of sugar. The strip A was placed in a solution of 10% sugar concentration while strip B was placed in 50% sugar Concentration
 -) What change was expected in strips A and B?

(2mks)

b) Account for the change in strip A.

(2mks)

- 6. The leaf of a potted green plant which had been kept in dark for 24 hours was smeared with petroleum jelly on its lower surface and then exposed to sunlight for 6 hours. Starch test on the leaf was negative. Account for the observation.
 - (2 marks)

7. What is the role of vascular bundles in plant nutrition?
8. The table below shows the energy use per day in kilojoules

(2mks)

Age(years)	Male is	Female
2	5,5000	5,500
5	7,000	7,000
8	8,800	8,000
11	10,000	9,200
14	12,500	10,500
18	14,200	9,600
25	12 100	8 800

a). From the table, explain why after age 8 males require more energy than females. (1mrk)

b). Other than sex and age, name *one* other factor that determine energy requirements in human beings (1mk)

(a) Name the excretory product produced in the liver and used in the intestine.

(lmk)

(b) State two functions of the waste product named in (a) above.
10. State three features that a grasshopper, a crab, a spider and a millipede have in common.

(2mks)

a) Namethehormonethatstimulatethematurationofihegraafianfolliclestoreleaseamatureovuminfemale reproductivecycle.

(3 mark)

b) Explainwhymenstruationdoesnottakeplaceafterfertilizationinhumanbeings.

(Imark)

11 (a) Define the following terms.

(2marks) (2marks)

i. Population

ii. Community

(b) Name a method that could be used to estimate the population size of the following organisms.

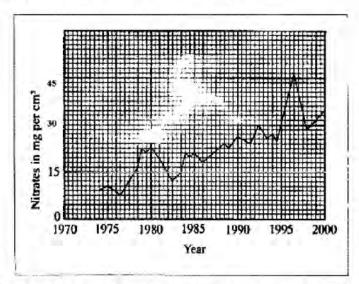
i. Fish in a pond.

(1mark)

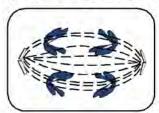
ii. Black jack in a garden.

(Imark)

12. Use the graph below to answer the question that follow.



- Calculate the difference in nitrate concentration between the highest and lowest. (1mk)
- How can increase in nitrate concentration in the river lead to death of fish?
- 13. The diagram below represents a stage during cell division.



Name the stage of cell division

Give two reasons for your answer in a) above.

c) State the significance of this stage of cell division in living organisms.

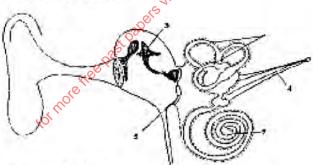
(1 mark (3mks)

(1 mark)

(2 marks)

14. State three roles of placenta during pregnancy.

15. The diagram below shows the human ear.



a). Name the structures labeled 3, 4

(2mks)

b) . State the function of the parts labeled 5 and 7.

(2mrks)

16. The diagram below show various types of gene mutations. Mutation I:

Mutation II:

Identify the type of mutations shown above

(2 marks)

ii) Name two examples of a disorder that results from gene mutation II.

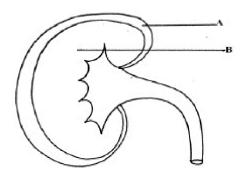
(1 mark

17. Name one disorder caused by a dominant gene in human.

(3mks)

(1mk)

18. The figure below shows a vertical section through a mammalian kidney.



- (a) Label the parts A and B (2mks) (b) Which part is the Bowman"s capsule found? (1mk) 19. Name two components of blood that are not present in glomerular filtrate. (2mks)
- 20. The oxidation state of a certain food is represented below by a chemical equation:-

 $2 C_3H_2O_2N + 6O_2$ $(NH)_2CO_2 + 5CO_2 + 5H_2O$

a) Calculate the respiratory quotients (RQ) of the food substrate (2 marks) (1 marks)

- b) Identify the food substrate
- 21. (a) State the part of the eye involved in:

(i) Colour vision.

- (ii) Maintaining the shape of the eyeball.
- (iii) Change in diameter of the lens.
- (b) A person was not able to see far objects clearly but could view near objects clearly. Name the eye defect the person had.

(1mk)

- (c) How could the defect in (b) above be corrected? (1mk) 22. (a)State the phylum where all members have open circulatory system. (1mk)
 - b) Explain the advantages of closed circulatory system over open circulatory system. (2 marks)
- 23. a) (i) What is meant by vestigial structures? (1mk)
- (ii) Give an example of a vestigial structure in human (1mk)
 - b) Explain why certain drugs become ineffective in curing disease after many years of use. (2mks)
- 24 a) Define the term immunity.
 - b) Distinguish between natural immunity and acquired immunity. (1mk)
- c) Identify one immunizable disease in Kenya. (1mk)
- 25. State three characteristics of members of kingdom Monera that are not found in other kingdoms. (3mk)

MURANG'A SOUTH MULTILATERAL EXAMINATION 2016

Kenya Certificate of Secondary Education (K.C.S.E)

33/2 BIOLOGY

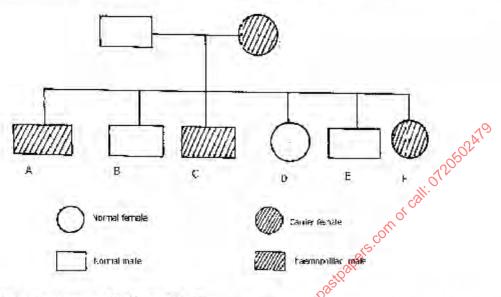
PAPER 2 (THEORY) JULY/AUGUST 2016

TIME: 2 HOURS

SECTION A (40 marks)

Answer all questions in this section in the spaces provided

I. Study the genetic chart below showing the inheritance of the gene responsible for haemophilia in a family,

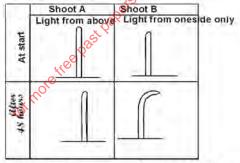


a) Write the genotype of individuals A. B

(2mks)

- b) A member of this family labeled F marries a haemophiliac male. What will be the phenotypic ratio of the offspring?

 Show your workings (4mks)
- c) Other than the condition stated above, state any other two common genetic disorders that result from gene mutation.
- 2. In an investigation, young plant shoots were exposed to 48hrs of light from above or from one side only. Their growth responses are shown in the diagrams below.



Name the response shown by the shoots and explain the advantages of this response to the plants.

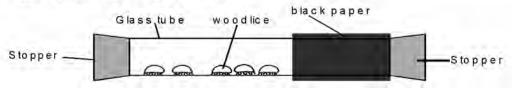
(2 mark)

ii) Account for the growth response of shoot B after 48 hours.

(3 mark)

b) An experiment was set up to study the response of woodlice to light. Ten woodlice were placed in a glass tube. After five minutes one end of the tube was covered with black paper to make it dark. The number of woodlice in light and dark was then recorded every minute for five minutes.

The diagram below shows the apparatus used.



The table below shows the results of the experiment.

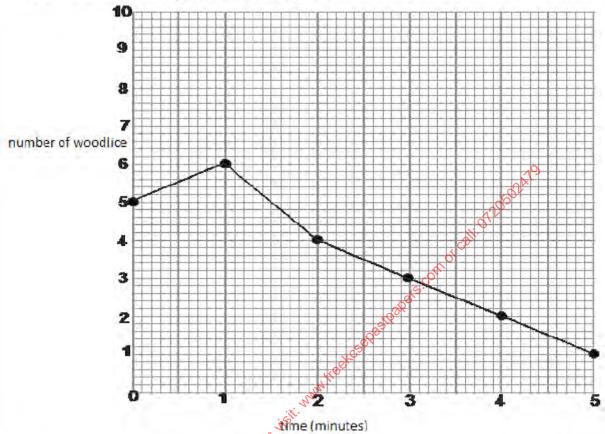
Time (min)		0	.1	2	3	4	5
Number of woodlice	In light	5	6	4	3	2	1
	In darkness	5	4	6	7	8	9

Why were the woodlice left there for five minutes before the black paper was placed on the tube?

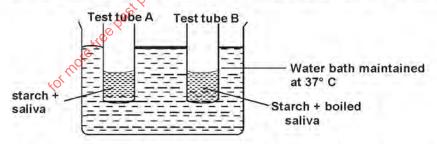
(1 mark)

ii) Plot the line graph on the grid below to show the number of woodlice found in the dark at each minute during the experiment.

The results for woodlice in light have already been plotted. (2 mark)



3. In an experiment to investigate an aspect of digestion, two test tubes A and B were set up as shown in the diagrambelow.



The test tubes were left in the bath for 30 minutes. The contents of each test tube was then tested for starch using iodine solution.

a) What was the aim of the experiment?

(1 mark)

b) What results were expected in test tube A and B.

(2 marks)

c) Account for the results you have given in (b) above in test tube A and B.

(2 marks) (1 mark)

d) Why was the set up left at 37°C?e) State two functions of bile juice in digestion.

(2 marks)

4. The diagram below represents epidermis of a leaf



a) Name the parts marked E, F and G

(3 marks)

b) State **two** aspects of cell E that are an adaptation to its function.

- (2 marks)
- c) Describe the changes that would take place in E if the cells were placed in concentrated sugar solution for a long period. (3 marks)
- 5. In Europe up to the 19th century, most moth i.e. *Biston betularia* were white speckled. Today upto 97% of the population recorded in the industrial towns in Europe are black. In rural areas most moth found are white speckled form.
 - i) Briefly explain how this has come about.

(5 marks)

ii) Name one cause of variation in nature.

(1 mark)

iii) What theory of evolution does it support the description in (i) above support?

- (1 mark)
- iv) In order to increase the quantity and quality of agriculture produce, man selects organisms with desirable characteristics to be parents of next generation. Name the practice.

SECTION B (40MARKS)

Answer questions 6 (COMPULSORY) and Either question 7 or 8

Rice seeds were soaked overnight. Fresh mass and dry mass of a sample of 20 seeds was obtained and recorded in the table. The rest of the seeds were planted in a tray that had soil and well watered daily. Twenty of the seeds/seedlings were removed from the soil every two days for two weeks. Their fresh and dry mass were taken and recorded in the table as shown below.

Time in days	Fresh mass in (g)	Dry mass in (g)
0	14.0	4.0
2	18.0	3.5
4	24.5	2.5
6	32.0	1.5
8	38.5	2.0
10	41.0	3.0
12	43.0	4.5
14	45.0	6.0

				G-	
- \	T I	1 - 4 4 1 - 4	. 4 1	ry mass over the two –week pe	riod (7mrks)
าดา	Lising the same axes	nioi iwo granns io renreser	it changes in tresh and d	mass over the two –week ne	rioa (/mrksi

b) What would be the fresh and dry mass of the seedlings at day 9.

(2mrks)

- i) Fresh mass
- ii) Dry mass
- c) Account for the change in fresh mass and dry mass between day 0 and day 6.

(4mrks)

- i) Fresh mass
- ii) Dry mass
- d) Explain the change in dry mass from day 8

(2mrks)

e) Explain why a sample of 20 seeds was used instead of one seed.

(2mrks)

f) State one factor within and one factor outside the seed that cause dormancy.

(2mrks)

- i) Within the seed
- ii) Outside the seed
- g) Give one characteristic of a meristematic cell

(1mrk)

- 7. Describe how the mammalian male reproductive system is adapted to perform its functions.
- (20mks)

Describe the role of hormones in the growth and development of plants

(20 marks)

MURANG'A SOUTH MULTILATERAL EXAMINATION 2016

Kenya Certificate of Secondary Education (K.C.S.E) 233/3

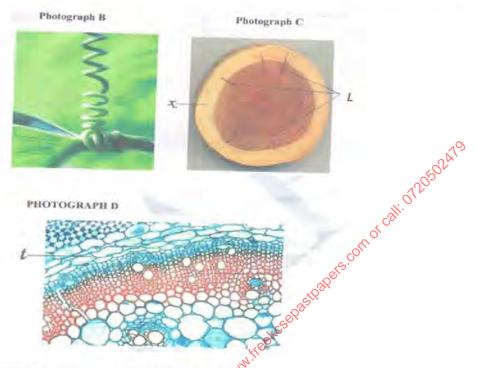
BIOLOGY

PAPER 3 (PRACTICAL)

JULY/AUGUST 2016

TIME: 2 1/4 HOURS

(a) Photographs B, C and D below represent support structures in plants. Use them to answer the questions that follow.



(i) Name the support structure represented by photograph B

(1mk)

(ii) Explain briefly how the coiling in photograph B occurs

(3mks

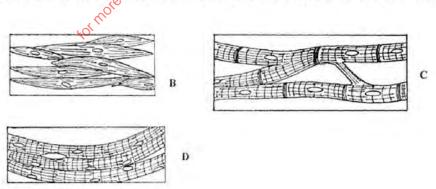
(iii) Name the structures labeled L on photograph C

(1mk)

- iv). Photograph D is a magnified photomicrograph of support tissues found in part x of photograph C. Give the name of the tissue labeled t. (1mk)
- (vi) Describe the structure of the cells of the tissue named in (a) (iv) above

(2mks)

(b) Figure 2 represents different types of muscles. Study them carefully and answer the questions that follow.



(i) Identify the muscles labelled C and B.

(2mks)

- (ii) Using observable features only; state two differences between muscles labelled B and D.
- (iii) State one function of each of the muscles labelled B and C.

(2mks)

(iv) Give one adaptation of a muscle labelled C to its function.

(1mk)

2. (a) You are provided with reagents

P – Iodine,

R-DCPIP

S-Sodium hydroxide

T-Copper (II) sulphate)

Use the reagents to identify the food substance(s) in solution K

	Food	Procedure	Observation	Conclusion	
				(9ml	ks)
(a)	Name the end product of di	gestion of food substance(s) present in solution K	(1mk	:)
(b)	Describe the assimilation of	f food substance(s) identifie	ed in 2(a) above	(2mk	s)
3.	You are provided with spec	imen labeled X, use it to an	swer questions that follow.		
(a)	(i) State the agent of polling	nation		(1mk	:)
	(ii) Give reasons for your	answer in a(i) above		(2mk	(as)
(b)	Describe FOUR floral parts	s of specimen X		(8mk	s)
(c)	(i) State the class to which	the specimen X belongs		(1mk	:)
	(ii) Give one reason for yo	our answer in c(i) above		(1mk	(as

GATANGA SUB-COUNTY EVALUATION TESTS 2016

Kenya Certificate of Secondary Education

BIOLOGY PAPER1 (THEORY) JULY / AUGUST 2016 TIME: 2 HOURS

1.	Name the organelle that would be most abundant in:	767
	i) White blood cells	(lmk)
	ii) Salivary glands	(lmk)
2.	State the functions of the following apparatus:	
	i) Pitfall trap	(1mk)
	ii) Bait trap	(1mk)

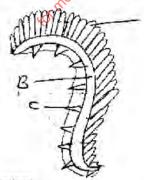
Study the figure below and answer the questions that follows:

apers.com or call. Or 20502 ATS a) Identify the kingdom to which the organism belongs to: (lmk) b) Name the structure labelled; A.B. (2mks) c) State the functions of the part marked A. (3mks) The following process takes place in a plant organelle. Hydrogen atoms + Oxygen i) Identify the organelle in which the process takes place. (lmk) ii) Name the process. (lmk) iii) State two conditions required for the process to take place. (2mks) a) What is translocation? (1mk) b) How is the phloem adapted to carry out its functions. (3mks)

6. The equation below represents a process that takes place in the body. Amino acid + Amino acid

i) Name the product Y. (1mk) ii) Name the processes A and B. (2mks)

Study the diagram below and answer the questions that follow:



a) Identify the structure. (lmk) b) Name the parts labelled B and C. (2mks)

c) Name a structure in insects that serves the same function as part labelled A. (lmk)

In an experiment using germinating seeds, it was found that 18cm³ of carbon (IV) oxide was released while 17.6cm³ of oxygen was used.

a) Calculate the respiratory quotient (RQ). (1mk) b) State the type of respiration occurring. (1mk) c) What is the likely respiratory substrate? (1mk)

Biology	p1, p2&p3

		108, p1, p2 ap.
9.	a) Nitrogen in the atmosphere cannot be directly utilized by plants. State two ways through which nitrogen is m	ade
	available for plant use.	(2mks)
	b) State the importance of saprophytic bacteria in the environment.	(2mks)
10.	State the functions of the following structures.	
	i) Epididymis	(1mk)
	ii) Prostrate gland	(1mk)
1.1		(THIK)
11.	Name the hormones that control the following activities;	
	a) Metamorphosis in young insect.	(1mk)
	b) Formation of abscission layer in leaves and fruits.	(1mk)
12	Explain the meaning of the term survival for the fittest.	(2mks)
		(ZIIIKS)
13.	What is the role of the following factors in breaking seed dormancy?	
	i) Light (1mk)	
	ii) Water.	(1mk)
14.	Name four mechanisms through which plants excrete.	(4mks)
	What do you understand by the following terms?	()
15.		(11)
	i) Ecosystem	(1mk)
	ii) Carrying capacity.	(1mk)
16.	Name the causative agent of pneumonia.	(1mk)
	a) What is a war and date?	(2mks)
17.	a) what is oxygen doot:	
	b) List down three economic importance of anaerobic respiration.	(3mks)
18.	a) What is active transport?	(1mk)
	b) Outline three roles of active transport in the human body.	(3mks)
19.	State the importance of the roughages in the diet.	(1mk)
	State three functions of blood other than transport.	(3mks)
	State three Interiors of Groot than transport.	
	Distinguish between Diabetes Mellitus and Diabetes Insipidus.	(2mks)
22.	What is meant by the term sex linkage? Mention two sex linked traits	(3mks)
23.	Name two hormones involved in reproduction in females.	(2mk)
2.4	Name three tissues found in animals.	(3mks)
	a) State the process that takes place during prophase 1 of meiosis.	(1mk)
25.	a) State the process that takes place during prophase 1 of melosis.	
	b) List down three economic importance of anaerobic respiration. a) What is active transport? b) Outline three roles of active transport in the human body. State the importance of the roughages in the diet. State three functions of blood other than transport. Distinguish between Diabetes Mellitus and Diabetes Insipidus. What is meant by the term sex linkage? Mention two sex linked traits Name two hormones involved in reproduction in females. Name three tissues found in animals. a) State the process that takes place during prophase 1 of meiosis. b) Give the significance of mitosis. The developing baby in the womb is connected to the mother by an umbilical cord. Describe two functions of the	(1mk)
27.	The developing baby in the womb is connected to the mother by an umbilical cord. Describe two functions of the	e umbilical
	cord. (2mks)	
28	Explain how support is attained in herbaceous plants.	(2mks)
	List down two adaptations of the male parts of wind pollinated flower to their function.	(2mks)
	Cell membrane is said to be semi-permeable. Explain.	(2mks)
30.	Explain how iris regulates amount of light entering the eye in bright light.	(2mks)
	Explain how iris regulates amount of light entering the eye in bright light.	
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GATANGA SUB-COUNTY EVALUATION TESTS 2016

Kenya Certificate of Secondary Education

231/2 BIOLOGY PAPER2 (THEORY) JULY / AUGUST 2016 TIME: 2 HOURS

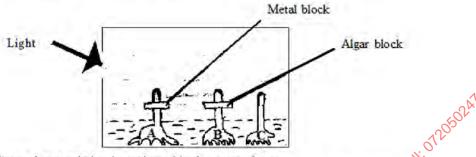
Pea seedlings were treated as follows:

Seedling A - Coleoptiles tip was cut off, metal block placed, then tip placed back.

Seedling B - Coleoptiles tip was cut off, agar block placed then tip placed back.

Seedling C - Was left intact.

The seedlings A, B and C were placed in dark box with a small hole at one side as illustrated in the diagram below;



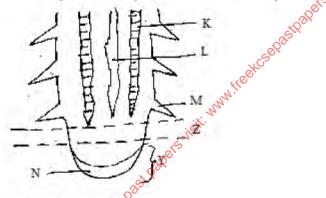
a) State what was being investigated in the set up above.

(2mks)

b) Using diagrams illustrate how the seedlings A, B and C appear after 48 hours. c) Explain the results in (b) above;

(3mks) (3mks

The diagram below represents a longitudinal section of a dicotyledonous plant root tip.



a) i) Name the parts labelled; K and M

(3mks)

ii) State the function of the part labelled N.

(lmk)

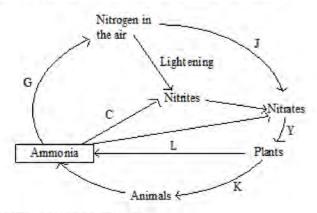
b) i) Name two main supporting tissues in plants.

(2mks)

ii) Give two reasons why support is necessary in plants.

(2mks)

Use the nitrogen cycle below to answer the questions that follow.



a) Name the processes represented by

(3mks)

i) G

ii) Y

iii) K

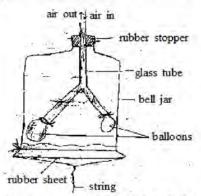
b) Name the group of organisms that cause processes

(3mks)

- i) C
- ii) J
- iii) L
- c) Name the state in which nitrogen exist in
- i) Plant tissue

(2mks)

- ii) Atmosphere
- A form two class set up the apparatus shown below to demonstrate the breathing mechanism of a mammal.



- a) What structure in a mammal is represented by each of the following?
- i) The glass tube.

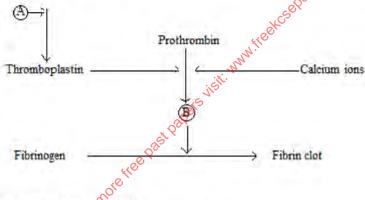
(4mks)

- ii) The balloons
- iii) The bell jar
- iv) The rubber sheet
- b) Explain what will happen to the balloons if the rubber sheet is;
- i) Pulled downwardsii) Pushed upwards

(2mks)

(2mks)

The diagram below represents the process that brings about blood clotting.



a) Name the substances A and B.

(2mks)

b) Name one source of calcium ions in the diet.

(1mk)

c) Name one more other role of calcium in the body.

(1mk)

d) Name the blood cells that are involved in blood clotting.

(1mk)

e) List down three structural adaptations of the red blood cells to their functions.

(3mks)

SECTION B

Answer question 6 (Compulsory) and either question 7 or 8

 The amount of water particles that moved across cell membrane was determined at various temperature. The data collected is as in the table below.

Temperature (°C)	0	5	10	15	20	25	30	35	40	45	50	55	60
Water particles that moved across a cell membrane	0	2	5	13	20	50	80	95	93	73	45	20	0

a) Draw a line graph to represent the amount of water particles that moved across the cell membrane temperature. (5mks)

against

- b) Account for the shape of the curve between;
- i) 200 350C.

(2mks)

Biology p1, p2&p3

(10mks)

ii) 40° - 60° C (3mks) c) i) Name and define the process by which water particles moved across the cell membrane. (2mks) ii) Other than the temperature, state and explain another factor that affect the rate of the process you named in c (i) above.(2mks) d) i) If the water molecules were moving across the cell membrane into a plant cell, name the state at which the cell would be if it was at 35° - 40° for 20 minutes. ii) State **two** forces that would be involved in the plant cell to result in the state of cells you named in d(i)above. (2mks) (1mk) e) i) State what would be expected if animals cells were used in d (i) above instead of plant cells. ii) Explain why plant cells behave differently from animal cells? (1mk) 7. How is the mammalian skin adapted to its functions? (20mks) 8. a) Describe the adaptations of the male reproductive system to its functions. (10mks)

b) Explain the role of the growth hormones in plants.

GATAGA FORM FOUR END OF TERM II EXAMINATION 2016

BIOLOGY PAPER 3 (PRACTICAL) JULY/AUGUST 2016 TIME: 1 ³/₄ HOURS

Attempt ALL the activities in this paper.

1. You are provided with specimens labelled J₁ and J₂.

a) Grind J_1 in a motor with a pestle into a smooth paste. Add some distilled water to make a suspension. Pour the suspension into two clean test tubes and using the reagents provided determine the food substance present. Use the table below to record your findings.

(8mks)

Food Test Procedure Observation Conclusion

b) Wash the pestle and motor thoroughly and prepare another suspension using specimen J_2 . Use the same reagent as in (a) above to determine the food substances present. Fill in your findings in the table below. (4mks)

Food Test Observation Conclusion

c) i) Name the process the food substance in J_1 has undergone to become the food substance J_2 . (1mk)

ii) Name the plant hormone involved in the transformation of J_1 to J_2 . (1mk)

The photographs on the leaf attached are of animals belonging to the same taxonomic unit (class).



- a) i) Name the class to which the organisms in the photographs belong.
- ii) State three reasons for your answer in a) (i) above.

(1mk) (3mks)

b) State three economic importance of organisms in this class.

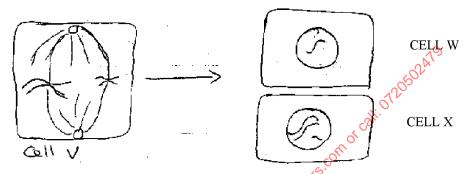
- (3mks)
- c) Use the following characteristics to prepare a two step dichotomous key of the animals in the photographs.
- (4mks)

- Step 1 Presence or absence of wings Step 2 - Type of mouth parts
- The colour of petals in flowers is determined by a pair of gene allele. You are provided with photographs of flowers with 3. different colours but from plants of the same species labelled P, R and Q.
 - a) Identify the main colour of each of the flower.

(3mks)

- b) A cross between plant P and plant R produced plant Q. Use appropriate letters to constitute the genotypes of:- (2mks) i) P

 - ii) R
- c) Using the genotypes constituted in (a) above, work out a cross between P and R to obtain the genotype of Q. (3mks)
- d) Supposing Q was self-pollinated, work out the cross to obtain the phenotypic ratio of the F₂ generation. Use a Punnet's (4mks)
- e) Cell V in the diagram below went through the 2nd meiotic division. The results were as in the gamete cells W and X.



i) Name the type of mutation demonstrated in the diagrams.

ii) Supposing gamete X fused with a normal gamete during fertilization, name a disorder in humans resulting from such a for more free past pagers visit, www.freekcf. condition. (1mk)

GITHUNGURI SUB COUNTY FORM 4 JOINT EXAMINATION

END OF TERM 2 EXAMS 2016

BIOLOGY

PAPER 1 TIME: 2 HOURS

- 1. State the function of the following cell organelles. (2 marks)
 - (i) Centrioles
 - (ii) lysosomes
- 2. Give the formula for calculating magnification of a specimen using: (2 marks)
 - (i) Light microscope.
 - (ii) Hand lens.
- 3. The following are some apparatus found in the biology laboratory. State their function. (2 marks)
 - (i) Pooter.
 - (ii) Pitfall trap.
- 4. Name two rules followed in binomial nomenclature. (2 marks)
- 5. State the part of chloroplast where the following stages of photosynthesis occur.(2 marks)
 - (i) Light stage.
 - (ii) Dark stage.
- 6. Give two factors that denature enzymes. (2 marks)
- 7. (i)State two main functions of progesterone hormone in reproduction. (2 marks)

(ii)Name two sex linked traits in human beings. (2 marks)

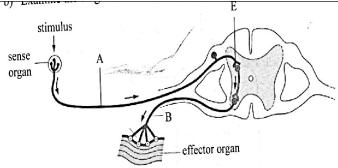
- 8. In <u>Drosophila Melanogaster</u>, the inheritance of eye colour is sex-linked. The gene for red eye colour is dominant. A cross was made between heterozygous red eyed female and a white eyed male.
 - Work out the genotypes of F₁ generation. (3 marks)
 - (ii) What is phenotyphic ratio of the F₁ generation? (1 mark)
- 9. The following processes occur during stages of meiosis. Indicate the stage in which they occur.(4 marks)
 - (i) Pairing of chromosomes.
 - (ii) Centromere divides.
 - (iii) Crossing over.
 - (iv) Bivalent at the equator.
- 10. Where is the hormone thyroxin produced? (1 mark)
- 11. A person met a lion as he walked along a forest path,
 - (i) Name the hormone that was secreted in his bloodstream and state its source. (2 marks)
 - (ii) What is the effect of the hormone in his: (2 marks)
 - (a) Circulatory system.
 - (b) Respiratory system.
- 12. Name the structure used by insects for gaseous exchange. (1 mark)
- 13. The diagram below shows a structure of a mature fruit from a dicotylenous plant.





- (ii) Name method of dispersal for the fruit.
- (iii) State one adaptation to method of dispersal named in (ii) above.
 - 14. Explain why.
 - (a) Red blood cell burst when placed in distilled water. (2 marks)
 - (b) Fresh water Amoeba doesn"t burst when placed in distilled water. (2 marks)
 - 15. (i) What is evolution? (I mark)
 - (ii)Distinguish between divergent evolution and convergent evolution. (2 marks)

16. Examine the diagram shown below and answer questions that follow.

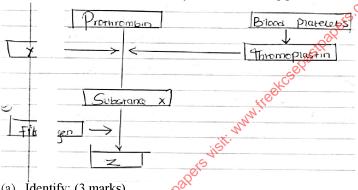


- (i) What does the diagram represent? (1 mark)
- Name parts labeled. (3 marks) (ii)

A

В

- 17. (i) What is meant by the term linkage? (1 mark)
 - (ii)Name three products of anaerobic respiration in plants. (3 marks)
 - (iii)In which part of the cell does anaerobic respiration occur? (1 mark)
- 18. State three adaptations of red blood cell to their function. (3 marks)
- 19. (i) What is Ecdysis? (1 mark)
 - (ii) What is the importance of Ecdysis? (1 mark)
 - (iii)Name the hormone the stimulate ecdysis. (1 mark)
- 20. In the four blood group, which person is referred to as: (2 marks)
 - Universal donor.
 - (ii) Universal recipient.
- 21. The flow chart below is a summary of blood clotting process in human beings.



- Identify: (3 marks)
- Substance S (i)
- 1etal ion Y (ii)
- nd product ZX (iii)
- (b) At from reducing blood loss, give another reason why blood clotting is important. (1 mark)
- on below represents oxidation of certain food substance. The eq

 $C_{57}H_{104}O_6 + 80 O_2 \rightarrow$

57CO₂+52H₂O+ATP

- Calculate respiratory quotient of food substance. (3 marks)
- Which food substance is being oxidized? (1 mark)
- 23. Study the dental formular below.

I-: C-: Pm-: m-

Giving reasons, name the mode of feeding of the animal with above dental formular. (2 marks) (i) Mode

Reason

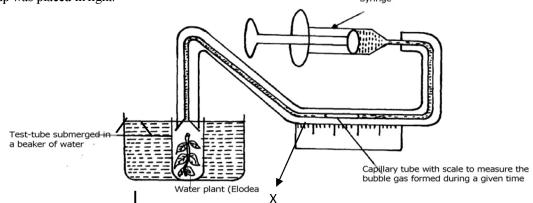
- (ii) How many teeth does the animal above have? (1 mark)
- What are the name space lacking teeth in the upper jaw? (1 mark)
- 24. Write down three structural differences between arteries and veins. (3 marks)
- 25. State the function of the following structures found in walls of trachea.(3 marks)
 - (i) Cilia.
 - (ii) Mucus.
 - (iii) Rings of cartilage.
- 26. State **two** functions of mucus secreted in the alimentary canal. (2 marks)
- 27. Differentiate between red blood cell and white blood cell. (2 marks)

GITHUNGURI SUB COUNTY FORM 4 JOINT EXAMINATION

END OF TERM 2 EXAMS 2016 BIOLOGY PAPER 2

SECTION A (40 MARKS)

1. Students carried an experiment and arranged their apparatus as shown below, to investigate a certain phenomenon. The set up was placed in light. Syringe



a) State the likely aim of the set up

b) State the role of the syringe in the set-up above

(1 mark) (1 mark)

c) (i) Name gas **X**.....

(1 mark)

(ii) Write an equation to show how gas X was formed in the set-up

(1 mark)

d) State three factors that increase the rate of enzyme activity

(3 mark) (1 mark)

(e) Give a reason why the test tube is immersed in a beaker of water

Q2. In an experiment, a black mouse was mated with a brown mouse. All the off springs in F₁generation were black. The off

springs grew and were allowed to mate with one another. The total number of F_2 generation offspring was 96.

- (a) Using letter **B** to denote the gene for black colour. Work out the genotype of the F_2 generation. (4 marks)
- (b) State the following for the F_2 generation
- (i) Genotypic ratio (1 mark)
- (ii) Phenotypic ratio (1 mark)
- (iii) The total number of brown mice (2 marks)

Q3. (a) Complete the table below showing Blood transfusion, tick ($\sqrt{}$) means no agglutination, cross (X) means agglutination. (4marks)

	DON	IOR	.X. 70		
		Ab	Ba	ABo	Oab
<u>_</u>	Ab	1		X	V
ien	Ba	X 200		X	1
Ë	ABo	1 3	V		1
ě	Oab	X Q	X		

(b) The type of circulatory system found in member of the class insecta is

(1mk)

- (c) Name the blood vessel that transports blood;
 - (i) From the small intestines to the liver

(1mk)

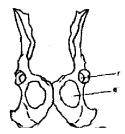
(ii) With the highest concentration of carbon (IV) oxide

(1mk)

(d) **Explain** why the wall of the left ventricle is thicker than that of the right ventricle

(2mks)

Q4 The diagram below shows two fused bones of a mammal.



(a) Identify the fused bones

(1mk)

- (b) Name the:
- (i) Bone that articulates at the point labelled F (ii) The hole labelled G

(1mk) (1mk)

(c) Name the three types of muscles found in the body of a human

(3mks)

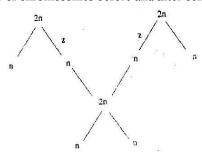
i) State one difference between a ball and socket joint and a hinge joint.

(1mk)

(1mk)

(ii) Name the structure at the knee that performs the same function as the olecranon process

5. The chart below shows the number of chromosomes before and after celldivision and Fertilization in a mammal.



- a) What type of cell division takes place at Z
- b) Where in the body of a male does process Z occur
- c) On the chart, indicate the position of parents and gamete
- d) Name the process that leads to addition or loss of one or more chromosomes.
- e) State three benefits of polyploidy in plants to a farmer

SECTION B 40 MARKS

Answer question 6 (compulsory and either question 7 or 8 in the spaces provided after question 8.

Q6. Scientists carried out an experiment to find out the effect of water and 0.9% salt solution on urine production in woman. On the first day, the woman drunk one litre of water, on the second day she drank one litre of 0.9%salt solution instead of water. The amount of urine produced at different times (in hours) was as recorded in the table below. Column X represent the volume of urine produced on the first day and column Y the urine produced on the second day.

Time in hours	Amount of uring produced in a	m ³ /hr
Time in nours	Amount of urine produced in o	ДП /ПГ.
	X	Y
0	80	40
1.0	60	40
1.5	360	40.0
2.5	520	45
3.5	240	80
4.5	60	100
5.5	100	60
6.5	40	80
7.5	60	100

- a) On the same axis draw graphs showing urine production in cm³/hr. against time.(7 marks)
- b) From the graph, determine; the amount of urine produced in the second hour when the woman drunk one litre of water.(1 mark)
- c) Determine the rate of urine production between the first and the second hours after the woman had drunk one litre of water. Show your working. (2 marks)
- d) Explain the difference in urine production between curves X and Y on the graph. (2 marks)
- e) What does the comparison of the results of the two experiment indicate about the effect of the kidneys on the osmotic pressure of the blood plasma.(3marks)
- f) What does the shape of the representing column X tell us about the rate of urine production?(2 marks)
- Suggest what happened to the one litre of salt solution over this period. (1 mark)
- h) State two functions of the hypothalamus in mammalian body. (2marks)
- 7. Describe the process of protein digestion absorption and assimilation in mammalian body. (20 marks)
- 8. Describe the mechanism of opening of stomata through starch –sugar interconversion theory

(20 marks)

GITHUNGURI SUB COUNTY FORM 4 JOINT EXAMINATION END OF TERM 2 EXAMS 2016 BIOLOGY

PAPER 3

- You are provided with specimen T which is an Irish potato tuber. You are also provided with benedicts solution, iodine solution, DCPIP solution, sodium hydroxide solution 1% copper sulphate solution, hydrogen peroxide, means of heating, beaker, mortar and pestle, test tube holder, labels and a test tube rack.
- Cut out a cube whose sides are about 1cm³ from the Irish potato provided. Using a mortar and pestle, crush the cubes to
 obtain the paste. Mix with water to make a total volume of 10cm³. Place the sample in a test tube labeled K. Immediately test
 the sample in test tube K for food substances using the reagents provided. Record in a table the food substance tested, the
 procedure of the test, the observations and the conclusions. (8mks)

Food	Procedure	Observation	Conclusion
Starch			
Reducing sugar			
Protein			_ 11 11 1
Vitamin C			

- a). Cut out another cube whose sides are 1cm² from the Irish potato tuber provided. Cut the cubes into halves. Place one of the halves in a test tube labeled A. Using a mortar and pestle, crush the other half into a paste and place it in a test tube labeled B. Put about 2cm³ hydrogen peroxide into each of the test tubes.
 - i. State the observations made in the two test tubes. (2mks)
 - ii. Explain the observations made in b(1) above(2mks)
- iii. Write down an equation for the reaction that was responsible for your observation.(Luck)
- b). State the importance of catalase in tissues. (3mks)
- 2. The photographs below show specimens of different types of fruits. Examine them.



- a) State the differences between specimens P and R(4mks)
- b) State the types of gynoecium and placentation of specimens P,S and V.(4mks) Specimen P:Gynoecium.....

Placentation

Specimen S Gynoecium....

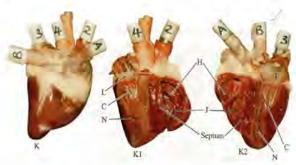
Placentation....

Specimen V Gynoecium....

Placentation

Name the mode of dispersal for each specimen and the features that adapt the specimen its mode of dispersal. (6mks)

The photograph labeled K is an intact mammalian heart while photograph K1 and K2are sections of a mammalian heart. Examine them



- The vessels labeled A and B drains blood in a chamber that leads to another chamber labeled J. The blood vessel labeled 3 drains blood into the chamber labeled L. When water is pumped under low pressure through vessel 3, it flows out through the vessel labeled 4. When water is pumped under low pressure through vessels A and B it flows out through the vessel labeled 2.
 - i. Name the chambers labeled Land J(2mks)
 - Name the blood vessels 2.3 and 4.(3mks)
- iii. Observe the walls of chamber J and those of chamber N in the sections of the heart. Account for the difference in the Kot mote free past pagers visit. www.free kcsepasthapers.com or calt. or 20% of the past pagers visit. www.free kcsepasthapers.com or calt. or 20% of the past pagers visit. www.free kcsepasthapers.com or calt. or 20% of the past pagers visit. www.free kcsepasthapers.com or calt. or 20% of the past pagers visit. www.free kcsepasthapers.com or calt. or 20% of the past pagers.com or calt. or 20% of the pagers of the past pagers.com or 20% of the pagers thickness of the walls.(3mks)
- iv. Name the structure labeled H and state its role. (2mks)

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WESTLANDS SUB-COUNTY JOINT EXAMINATION

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

231/1

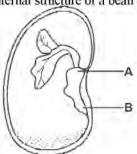
BIOLOGY

PAPER 1

TIME: 2 HRS

JULY/AUGUST 2016

- 1. a) How is the fovea centralis adapted to its function? (1 mark)
 - b) A person was not able to see near objects clearly but could view far objects clearly. State the eye defect the person had.
 - c) How can the defect be corrected? (1 mark)
- 2. The diagram below shows the internal structure of a bean seed. Study it.



a) Name part A(1 mark)

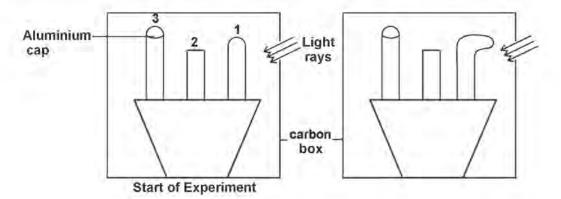
b) Why is it important that part B develops first during germination? (2 marks)

3. When internal pressure reduces in the following tubular structure; xylem, traches of insects and bronchus in human do not collapse. Identify what prevents them from collapsing:

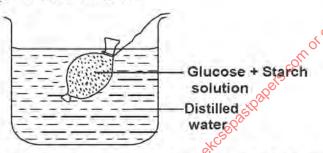
- a) Xylem vessels (1 mark)
- b) Bronchi in human (1 mark)
- c) Trachea system of insects (1 mark)
- 4. a) State the function of sepals. (marks)
 - b) Explain how double fertilization occurs in flowering plants. (_marks
- 5. How are leaves of submerged planting adapted for photosynthesis? (2 marks)
- 6. Identify the stages in cell division in which the following events take place.
 - a) Chromosomes are found at both ends of the spindle fores.
 - b) Synopsis
- c) What is the importance of crossing over? (7) mark)
- 7. State the functions of the following cell organches;
 - a) Nucleolus
 - b) Lysosome
- 8. State two roles of green plants in a fish aquarium other than food for fish. (2 marks)
- Plants do not have ability to move from one place to another. How do they compensate for this in order to carry out the following processes.
 - a) Reproduction (2 marks)
 - b) Nutrition (2 marks)
- 10. During an accident, a victim suffered injuries in the head. After the accident he lost his memory and was passing excessive amount of dilute urine. Suggest the part of the brain which was damage.
 - a) Memory
 - b) Passing large amount of dilute urine
- There are five kingdoms into which organisms are classified; namely, Animalia, Plantae, Fungi, Protoctista and Monera.
 State three characteristics of kingdom Monera that are not found in the other kingdom. (3 marks)
- 12. a) State two features of the phloem sieve tubes. (2 marks
 - b) State the reasons for the following adaptations of the xylem vessels.
 - i) Lack of cross walls (1 mark)
 - ii) Narrow lumen (1 mark)
- 13. a) Name the most suitable biological equipment for collecting the following organisms:

 - b) State the term that refers to the scientific system of assigning two names to an organism. (1 mark)

14. The diagram below show san experiment performed on oat coleoptile. Coleoptile was left intact, coleoptile 2 had its tip cut off and coleoptile 3 had its tip covered with aluminium foil cap.

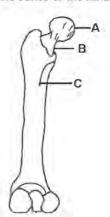


- a) State the type of response being investigated. (1 mark)
- b) Name the chemical substance that causes the response shown by the coleoptiles. (1 mark)
- c) Explain the observations made on coleoptile. (2 marks)
- 15. Give three reasons why biological control method is preferred to chemical control method in the control of pests and parasites. (3 marks)
- 16. Students set up an experiment as shown below.



The set up was left to stand for 40 minutes after which starch test and reducing sugar test was carried out on the distilled water.

- a) State the observation made by the students.
 - Starch test (1 mark)
 - Reducing sugar test (1 mark)
- b) Explain the observations in (a) above.
- (3 marks)
- 17. In an investigation, the pancreatic duct of a rat was blocked by tying it with a string. Explain how this affected the following processes.
 - a) Digestion of food
- (2 marks)
- b) Regulation of blood glucose devel. (2 marks)
- 18. a) Distinguish between homozygote and heterozygote.
- (marks)
- b) Ability to roll the tongue is dominant to rolling of tongue. If a woman who roll her tongue marries a man who is a tongue roller but is the son of a non-roller father. What would be the chances of them producing a non-roller child. (3 marks)
- 19. The diagram below shows one of the bones of the hind limb.



a) Identify the bone(1 mark)

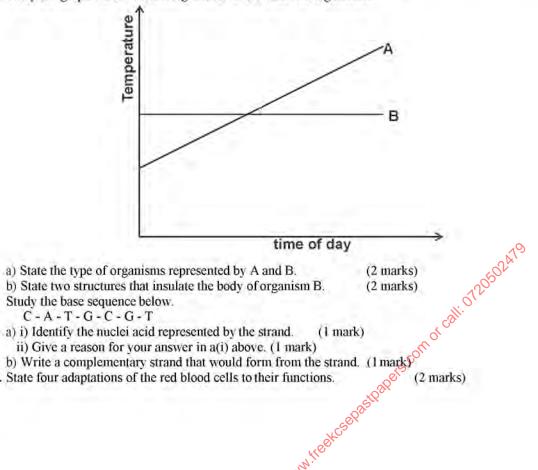
b) Name the parts labelled A,B,C

(2 marks)

20. a) State two ways in which white blood cells protect the body against disease-causing micro-organisms. (2 marks)

b) Name a source of white blood cells in the human body. (I mark)

21. Study the graphs of the thermoregulation in two different organisms.



22. Study the base sequence below.

tor more tree past pagers visit, www.treekcsepastr 23. State four adaptations of the red blood cells to their functions.

WESTLANDS SUB-COUNTY JOINT EXAMINATION

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 2

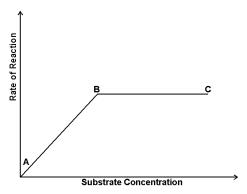
TIME: 2 HRS

JULY/AUGUST 2016

SECTION A (40 MARKS)

Answer ALL questions in the spaces provided.

1. The graph shows the effect of substrate concentrate on the rate of enzyme reaction.



a) Account for the shape of the graph between;

i) A and B

(3 marks)

ii) B and C

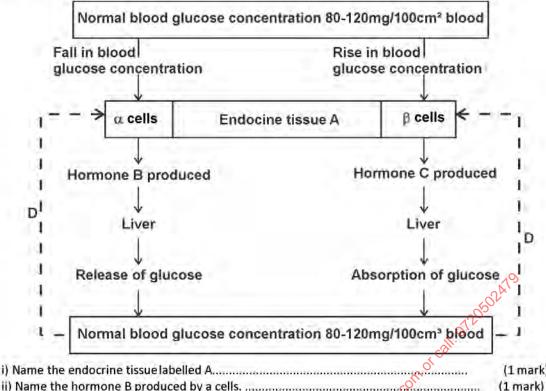
(2 marks)

- com or call. of 20502 Are b) How can the rate of reaction be increased after point B?
- c) State two properties of enzyme that make them be said to be efficient. (2 marks)
- 2. a) State the causative agents of the following diseases;
 - i) Amoebic dysentery (1 mark)
 - ii) Typhoid
 - b) Name the cells in the human body that are infected by plasmodium. (1 mark)
 - c) State three adaptations of Ascaris lumbricoides to its parasitic life. (3 marks)
 - d) State two control measures for cholera. (2 marks)
- 3. a) Define sex-linkage. (2 marks)
 - b) Name two traits in humans that are linked to Y chromosome. (2 marks)
 - c) In a family, a man who is haemophiliac has two sons. One of the sons is haemophiliac while the other son is normal. What is the probability of one of his daughter being haemophiliac?

(Use punnet square to show your working) (4 marks)

- a) Define the following terms.
 - i) Comparative anatomy <1 mark)
 - ii) Vestigial structures (1 mark)
 - iii) Adaptive radiation (2 marks)
 - b) Explain; Charles Darwin's idea of "survival of the fittest". (2 marks)
 - c) Lamarck's idea of "use and disuse". (2 marks)

b) Study the flow diagram showing the role of the pancreas in controlling blood glucose concentration;



(1 mark)

(1 mark)

iii) Name the hormone C produced by the B cells. (1 mark)

c) Briefly describe how hormone B brings about a rise in blood glucose concentration when itreaches the liner. (3 marks)

SECTION B (40 MARKS)

Answer question 6 (compulsory) and either 7 or 8.

In an experiment to determine the effect of ringing on the concentration of sugar in the phloem. A ring of bark from the stem of a tree was cut and removed. The amount of sugar in grammes per 16cm3 piece of bark above the ring was measured over a 24hr period. Sugar was measured over a 24hr period. Sugar was also measured in the back of a similar stem of the same species which was not ringed. The results are shown in the table below.

Time of the day	Amount of sugar in gramme	Amount of sugar in grammes per 1cm ³ piece of bark				
	Normal stem	Ringed stem				
6.45am	0.78	0.78				
9.45am	0.80	0.91				
12.45pm	1.81	1.01				
3.45pm	1.80	1.04				
6.45pm	1.77	1,10				
9.45pm	0.73	0.95				
12.45am	0.65	0.88				

- a) Using the same axis, plot graphs of the amount of sugar against time for both stems. (6 marks)
- b) At what time was the amount of sugar highest in the;
- i) Ringed stem
- (1 mark)
- ii) Normal stem
 - (1 mark)
- c) How much sugar would be in the ringed stem if it was measured at 3:45am.
- d) Give a reason why there was sugar in the stem of both trees at 6:45am. (2 marks)
- e) Account for the shape of the graph for the tree with the ringed stem between;
- i) 6:45 and 3;45pm (3 marks)
- ii) 3:45pm and 12:45am
- (2 marks)

(2 marks)

f) Name the structures in the phloem that are involved in the translocations of sugars.

g) Name two elements required for the formation of chlorophyll in plants. (2 marks)

7. a) Define the following biological terms:

i) Excretion (1 mark) ii) Secretion (1 mark)

b) Explain how mammalian skin is adapted to perform the following functions:

i) Thermoregulation (10 marks)

ii) Protection (8 marks)

8. a) Explain why water, oxygen, optimum temperature and enzymes are necessary during germination of seed in plants. (10 marks)

b) Explain the role of the following plant hormones in growth and development.

i) Gibberellins (5 marks)ii) Cytokinin (5 marks)

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GEM SUB-COUNTY FORM 4 JOINT EVALUATION

Kenya Certificate of Secondary Education

231/1

BIOLOGY

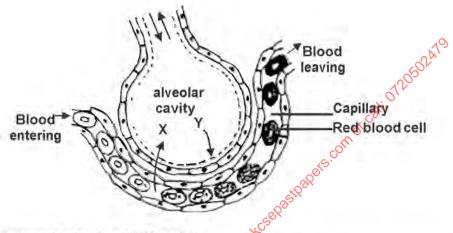
Paper 1

(Theory)

July/August 2016

Time: 2 Hours

- 1. Explain the following terms:
 - a) Taxonomy (1 mark)
 - b) Species (1 mark)
 - c) Cytology(1 mark)
- 2. State three features used in classifying arthropods into classes. (3 marks)
- 3. The diagram below represents gaseous exchange in the alveolus.



a) Identify the gases labelled X and Y (2 marks)

b) Describe the path followed by gas Y from alveolar space until it reaches the red blood cells.

(3 marks)

- 4. State the importance of each of the following excretory products in plants.
 -) Quinine (1 mark)
 - ii) Latex (1 mark)
 - iii) Papain (1 mark)
- 5. Name the causal organism of the following diseases in humans: (2 marks)
 - a) Bilharzia
 - b) Syphillis



- ii) How is the organelle you have identified in a(i) above adapted to its function. (2 marks)
- 7. a) Explain how the following parts of a mammalian reproductive system are adapted to their functions.

(2 marks)

- i) Testis
- ii) Uterus
- b) Explain why removal of the ovary after four months of pregnancy does not terminate pregnancy.

(2 marks)

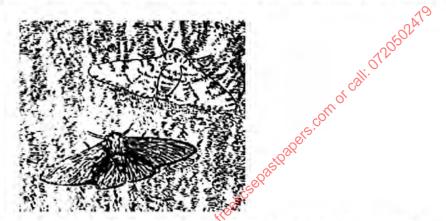
- 8. State the role of the following hormones in homeostasis.
 - i) Antidiuretic hormone (vasopressin)(1 mark)
 - ii) Aldosterone hormone (1 mark)

- Distinguish between plasmolysis and haemolysis.
- (2 marks)
- 10. Give two reasons why pressure of blood is greater in arteries than in the veins of mammals. (2 marks)
- 11. The sketch below illustrate a portion of chromosome with genes E, G, H, P, Q and R

E	G	Н	Р	Q	R

Using sketch similar to the one above, illustrate the changes that the above chromosome would undergo. If the following mutations occurred on gene H and P.

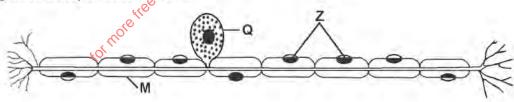
- a) Deletion (1 mark)
- b) Inversion (1 mark)
- c) Duplication (1 mark)
- 12. a) Guard cells are specialised epidermal cells. State two structural features which suit them to their function.(2 marks)
 - b) Apart from gaseous exchange give one other function of the stomata. (1 mark)
- 13. State three adaptation of xylem to its function. (3 marks)
- 14. The photograph below is two varieties of peppered moth Biston betularia resting on the bark of a tree.



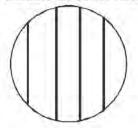
Explain using the photograph how natural selection will determine the survival of each variety.

(3 marks)

- 15.a) Explain how the following adaptation of xerophytes assist them to survive in their habitat.
 - Sunken stomata (1 mark)
 - ii) Thick cuticle (1 mark)
 - b) State the structural differences between the root system of the xerophytes and that of the hydrophytes. (2 marks)
- 16.Distinguish between homologous and analogous structures. (2 marks)
- 17. The diagram below represents a nerve cell.



- a) Identify with a reason the type of neurone above. (2 mark)
- b) Name parts labelled :Q,Z (2 marks)
- 18.a)Name three supportive tissues in plants. (3 marks)
 - b) Name the type of muscle found in the gut. (1 mark)
- 19. A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view.



- a) Define the term resolving power. (1 mark)
- b) If the student counted 20 cells across the field of view calculate the size of one cell in micrometers. (2 marks)
- 20. A student added equal amounts of blood to equal volumes of salt of different concentrations. She observed and counted the red blood cells at the beginning of the experiment and at end of the experiment. The results were as shown:

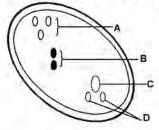
Set up	Concentration of salt	Beginning	After 30 mins
Α	0.1 mol	500	500
В	0.01 mol	500	250

Account for the results in :

- a) Set up A (2 marks)
- b) Set up B (2 marks)
- 21. Below is a dental formula of certain organism. Use it to answer the questions that follow, $i\frac{0}{3}, \frac{0}{1}, \frac{0}{2}, \frac{m}{3}$

$$i\frac{0}{3}, \frac{0}{1}, p\underline{m} \frac{3}{2}, \underline{m}$$

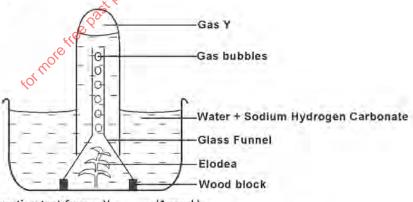
- i) Calculate the total number of teeth in the mouth of the organism. www.teekcsepastpapers.com or call. or 205021 (2 marks)
- ii) Identify the mode of nutrition of the organisms.
- 22. State two precautionary measures to control the outbreak of cholera.
- 23. The diagram below shows a mature embryo sac of a flowering plant.



- Name the parts
 - A (1mk)
 - .1mk) ii)
 - b) What is the function of the structure labelled B?

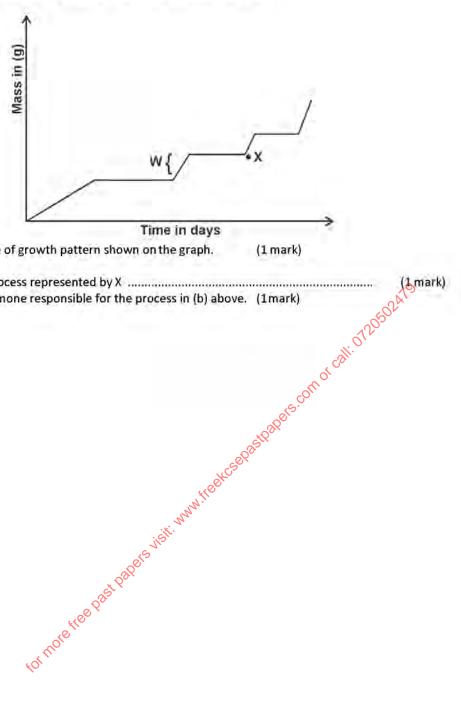
(1 mark)

24. In an experiment to investigate a product of photosynthesis, the set up was as shown in the diagram below. The apparatus was placed in the sun.



- a) State the confirmation test for gas Y
- (1 mark)
- b) Explain why Elodea is the most suitable plant for this experiment.
 - (2 marks)
- c) State the functions of the sodium hydrogen carbonate in the experiment. (1 mark)
- 25. Explain why individuals with smaller body sizes requires more energy per kg of body weight than those with large body sizes. (3 marks)

26. The graph below represents the growth of animal in a certain phylum.



Name the type of growth pattern shown on the graph.

- b) Identify the process represented by X
- c) Name the hormone responsible for the process in (b) above. (1mark)

GEM SUB-COUNTY FORM 4 JOINT EVALUATION

Kenya Certificate of Secondary Education

231/2

BIOLOGY

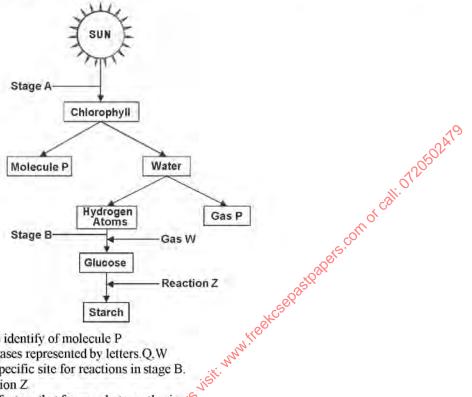
Paper 2

(Theory)

July/August 2016

Time: 2 Hours

1. Below is a diagrammatic summary of the main biochemical events in photosynthesis. Study it carefully and answer the questions that follow.



a) Suggest the identify of molecule P

(1 mark)

b) Name the gases represented by letters.Q.W

(2 marks)

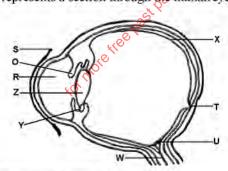
c) Name the specific site for reactions in stage B. d) Name reaction Z

(1 mark)

State three factors that favour photosynthesis

(1 mark) (3 marks)

The diagram represents a section through the human eye.



a) Name the parts labelled R and S

(2 marks)

b) State the differences between parts labelled T and U

(2 marks)

c) What could be the effect of having W being defective.

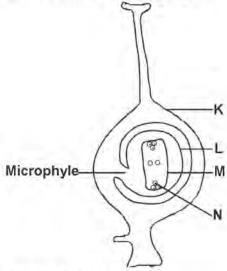
(1 mark)

d) Describe how the part labelled X is adapted to its function.

(2 marks)

e) A person reading a book under a tree shade suddenly looks up to see a jet flying over. State the changes that occur in structures Y and Z. (1 mark)

3. The diagram below shows a cross-section through a pistil.



a) Name the structures labelled K, L and M

b) What do the following parts develop into after fertilization.

i) Part M

ii) Part L

iii) Part N

c) In which two ways do plants promote cross fertilization.

(2 marks)

(3 marks)

In a certain bird species, when a white bird (W) is crossed with a black bird (B) all the offspring in F1 generation are blue.

a) Using a punnet square, work out the phenotypic ratio expected when the F1 generation are selfed.

b) State the genotypic ratio of a cross between a black and blue bird.

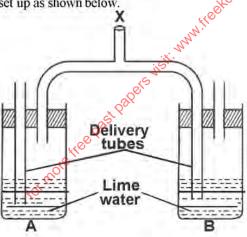
(4 marks)

(1 mark) (1 mark)

Name the type of dominance expressed in F1 above. What is mutation. d)

(2 marks)

An experiment was set up as shown below.



- A student blew air in and out through point X. Using arrows, indicate on the diagram how air gets in and out of the setup. (2 marks)
- In which of the test tube would lime water forms white precipitate first. (1 mark) b)

ii) Give a reason. (1 mark)

What is the effect of lactic acid in the thigh muscles of an athlete after a short fast race. (2 marks)

d) Identify the type of muscle in human being where formation and effect of lactic acid is not felt. (1 mark)

e) What is the biological significance of boiling milk (Ultra heat treated milk)

(1 mark)

SECTION B: (40 MARKS)

Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided.

6. An experiment was carried out to investigate plasmolysis in onion epidermal cells. The epidermal cells were placed in different concentrations of sodium chloride solution. The percentage of plasmolysed cells was determined after 30 minutes. The results were as shown in the table below.

Salt concentration (g/100cm ³⁰ %)	Onion epidermal cells plasmolysed (%)
0.35	0
0.40	15
0.45	30
0.50	69
0.55	82
0.60	91
0.65	100

a)	On	the	grid	provided	plot a	graph of
a	, Оп	uic	giiu	provided	prot a	graphor

plasmolysed epidermal cells against salt concentration.

(6 marks)

At what concentration of salt solution was the proportion of plasmolysed cells equal to non-plasmolysed cells. iii) State the salt concentration at which 45% of the cells are plasmolysed.

(1 mark) (1 mark)

b) Account for the results obtained at:

0.35% salt concentration i)

(3 marks)

0.65% salt concentration ii)

(3 marks)

i) What does the term plasmolysis mean? (1 mark)

ii) Name the process by which plasmolysis is reversed.

(1 mark)

Does plasmolysis occur in animal cells. Explain.

(2 marks)

What is the relationship between molar concentration of the salt solution and the percentage of plasmolysedcells. (2 marks) e)

7. Give four modes of expressing food relationships in an ecosystem. (4 marks) a) i)

Explain how food as a factor regulate the population of animals in an ecosystem. (8 marks) ii)

b) How are desert plants adapted to conserving water.

(8 marks)

8. Discuss the role of hormones in plants growth and development.

(20 marks)

GEM SUB-COUNTY FORM 4 JOINT EVALUATION

BIOLOGY

Paper 3

July/August 2016

CONFIDENTIAL INSTRUCTIONS

Each candidate should be provided with the following:

- 4 beakers of 250ml
- 4 pieces of visking tubing measuring 10cm each
- 4 pieces of threads measuring 0.5m each
- means of timing
- concentrated solution of sodium chloride labelled solution B(200ml)
- distilled water labelled solution A (500ml)
- 0.1% sucrose solution labelled solution C(20ml)
- 4 labels

GEM SUB-COUNTY FORM 4 JOINT EVALUATION

BIOLOGY

Paper 3

July/August 2016

1. You are provided with solutions A, B and C.

Put 150ml of solution A into beakers P, V and X. Then put about 150ml of solution B into beaker labelled WMark the level of liquid in each beaker. Take one piece of visking tubing and add 10ml of solution B.

Tie the open end with one length of the thread and place the visking tubing into the beaker labelled P

It is important that there is no leakage at either end of the visking tubing. Then label this set up P

Take the second visking tubing, put 10ml of solution C and tie it with one length of thread. Place it in beaker labelled V. Label this set up V

With the third piece of visking tubing put 10ml of solution A, the the open end and place it into the beaker labelled X. Label this set up X

With the fourth visking tubing put 10mls of solution A and tie the open ends

Place it in the beaker labelled W. Label this set up W.

Leave the set ups for about 30 minutes

NB: Ensure that the visking tubings are completely immersed in the solutions poured in the respective beakers.

a) Record your observations in the table below.

(8 marks)

	Size of visking tubing after 30 minutes	Level of liquid in the beakers after 30 minutes
Set up P	*10°	
Set up V	de.	
Set up X	of the	
Set up W	(0.	

- b) Explain the changes you observed in:
- i) Set up W (2 marks)
- ii) Set up X (2 marks)
- iii) Set up P and V

(4 marks)

c) i) State the nature of solutions A and B (2 marks)

Solution A

Solution B

2. Below are diagram of simple succulent fruits. Study them carefully and use them to answer the questions that follow. T/S of an orange fruit (A) L/S of a mango fruit (B)





 a) What typ 	e of simple succul	lent fruit is:
---------------------------------	--------------------	----------------

i) Fruit A	(1 mark)
ii) Fruit B	(1 mark)
b) Give reasons for your answers in 1(a) above.	

i) Reasons for fruit A (2 marks) ii) Reasons for fruit B (2 marks)

c) State the type of placentation found in:

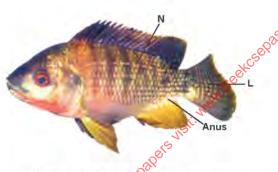
Fruit A (1 mark) i) ii) Fruit B (1 mark)

d) With a reason state the mode of dispersal for fruit A

Mode of dispersal (1 mark)

ii) Reason (1 mark)

3. Below is a diagram of a bony fish which lives in fresh water habitat.



a) Name the class to which the fish belongs (1 mark)

b) Using observable features only give two reasons for your answer in 2(a) above.				
c)	i)	Name the part of the fish labelled N	(1 mark)	

ii) State the function of part N

(1 mark) d) State two functions of the part labelled L during movement of the fish in water. (2 marks)

e) Using observable features only describe three ways by which the fish is adapted to living in its habitat. (3 marks)

Name one structure on the fish that prevents it from pitching. (1 mark)

Name one structure on the fish that prevents it from yawing. (1 mark) ii)

g) i) What is meant by tail power? (1 mark)

ii) During a Practical study students made measurements on a fish and found out that its bodylength from the tip of the mouth to the tail tip was 30cm and the length from the tail tip to the anus was 12cm. Use this information to calculate the tail power of the fish. (2 marks)

iii) State the importance of tail power to a fish as it swims in water.

(1 mark)

GUCHA SOUTH EVALUATION TEST (GSET)

Kenya Certificate of Secondary Education

231/1

BIOLOGY

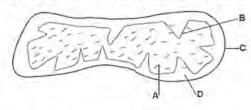
Paper 1

(Theory)

July/August 2016

Time: 2 Hours

- 1. Name two major branches of biology. (2 marks)
- 2. State three reasons why classification is important. (3 marks)
- 3. a) Distinguish between respiratory quotient and oxygen debt. (1 mark)
 - b) Name the site where anaerobic respiration occur in a cell. (1 mark)
- 4. State three differences between chilopoda and diplopoda. (3 marks)
- 5. a) Name two products of light stage during photosynthesis. (2 marks)
 - b) State three differences between light stage and dark stage of photosynthesis. (3 marks)
- 6. State the function of the following apparatus:
 - Bait trap(1 mark)
 - ii) Pooter (1 mark)
- The diagram below represents a cell organelle.



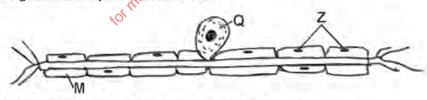
- a) Identify the organelle. (1 mark)
- b) Name the part labelled B (1 mark)
- c) State the functions of the part labelled A
- (1 mark) a) State three features that hinder self fertilization in a flower. (3 marks)
 - b) The table below show two mammalian hormones. For each hormone state the site of production and its function in the body.

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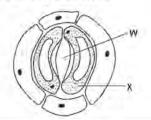
Hormone	Site of production	Function
Oestrogen	355	
Aldosterone	OaR	

(2 marks)

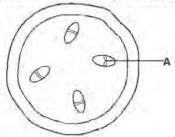
- 9. a) Define the term natural selection. (1 mark)
 - b) Why are some viruses able to resist the effect of antiretroviral drugs. (2 marks)
- 10. The diagram below represents a nerve cell.



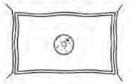
- a) Identify with a reason the type of nerve cell above. (2 mark)
- (2 marks) b) Name the parts labeled Q,Z
- 11. State the functions of the following cell organelle.
 - a) Golgi apparatus (1 mark)
 - b) Lysosomes (1 mark)
- 12. The diagram below shows part of plant tissue.

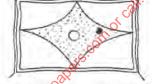


- a) Name the cell labelled X and the part labelled W (2 marks)
- 13. The diagram below show a section of plant organ.



- a) i) Name the class of the plant form which the section was obtained. (1 mark)
 - ii) Give a reason for your answer in a(i) above. (1 mark)
- b) State the function of the part labelled A(1 mark)
- 14. How does low power objective lens manipulated for specimen observation under lightmicroscope ? (2 marks)
- 15. What is meant by
 - i) Autecology (1 mark) ii) Synecology (1 mark)
- 16. a) Explain why plants do not require specialised excretory organs. (4 marks)
 - b) Explain what happens in humans when the concentration of glucose in blood decreases below the normal level. (2 marks)
- 17. The diagram below represents a plant cell that was subjected to a certain treatment.

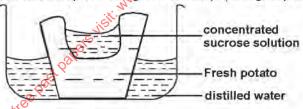




At the start

At the end of the experiment

- a) Account for the shape of the cell at the end of the experiment. (2 marks)
- b) Draw a diagram to illustrate how an animal cell would appear if subjected to the same treatment. (1 mark)
- 18. Name the cartilage between the vertebrae of vertebral column. (1 mark)
- 19. The experiment illustrated below was set up to investigate a certain physiological process using a fresh potato tuber.



Suggest the possible physiological process that was being investigated. (1 mark)

- b) Explain the result in (a) above. (3 marks)
 - c) State two benefit of the process named above to plants. (2 marks)
- 20. State three ways in which respiratory surfaces are adapted to their function. (3 marks)
- 21. If the nerve supply to the heart of a mammal is severed, the rhythmic heart contraction and relaxation will go and the heart continues to beat. Explain. (2 marks)
- 22. To estimate the population size of fish in a certain pond, traps were laid at random and 600 fish were caught marked and released back into the pond. 3 days later traps were laid and 240 fish were caught out of which 80 of them had a mark. Calculate population size of the fish in the pond. (3 marks)
- 23. Name the process that result to the formation of tissue fluid. (1 mark)
- 24. a) Name the material that strengthen xylem vessel. (1 mark)
 - b) Other than sugar name other one compound translocated in the phloem. (1 mark)
- 25. State one adaptation of the following parts of mammalian eye.
 - a) Fovea centralis (1 mark)
 - b) Sclera (1 mark)
- 26. a) Define the term allele (1 mark)
 - b) i) Differentiate between continuous and discontinuous variation. (2 marks)
 - ii) Name two examples of discontinuous of discontinuous variation in human beings. (2 marks)
- 27. a) Differentiate between hypogeal and epigeal germination. (2 marks)
 - b) State one cause of dormancy in seeds. (1 mark)

GUCHA SOUTH EVALUATION TEST (GSET)

Kenya Certificate of Secondary Education

231/2

BIOLOGY

Paper 2

(Theory)

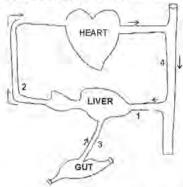
July/August 2016

Time: 2 Hours

SECTION A: (40 MARKS)

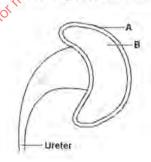
Answer all question in this section in the spaces provided.

1. Study the diagram of part of the circulatory system in a mammal below and use it to answer questions that follow.



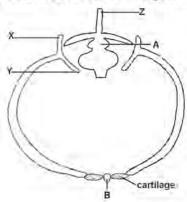
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- a) Explain why the level of blood sugar in vessel 2 will be higher than vessel 3 during fasting. (3 marks)
- b) i) Identify vessel 1 (1 mark)
- ii) Name the vessel with highest concentration of urea. (1 mark)
- c) i) Outline two primary functions of roots. (2 marks)
- ii) Name a tissue responsible for translocation of manufactured food in higher plants. (1 mark)
- 2. a) What is the meant by accommodation of the eye? (1 mark)
 - b) Explain how light rays are focussed on the retina from a near object. (4 marks)
 - c) State one functional difference between rods and cones in the human eye. (1 mark)
 - d) Explain why images that form on the blind spot are not perceived. (2 marks)
 - 3. In a certain variety of plants a true breeding white flowered plant was crossed with a true breeding red flowered plant. All the floral petals in the F1 plants had white and red patches.
 - a) Define the term true breeding. (1 mark)
 - b) Name the biological phenomenon responsible for the presence of the red and white patches in the F1 plants. (1 mark)
 - c) The F1 plants were selfed. Using letter R to represent the gene for red flowers and W for the white flower, work out the F2 generation. Show your workings (4 marks)
 - d) Study the analogies below of some distorted information and identify the type of mutation they represent. (2 marks)
- 4. Study the diagram below representing section of a mammalian excretory organ and use it to answer questions that follow.



- a) i) Name the organ. (1 mark)
- ii) Identify the parts labelled A and B (2 marks)
- iii) Name the endocrine gland found immediately above the organ named in a(i) above, (1 mark)
- b) i) Plants do not require elaborate excretory organs as animals do, Explain. (2 marks)
- ii) Name two processes through which plants excrete their waste products. (2 marks)

5. The diagram below shows a section of a ribcage of man. Study it and use it to answer questions that follow.



- a) Identify the vertebrae A (1 mark)
- b) Name the two parts (X and Y) of the rib which provide a surface for articulation with vertebrae A. (2 marks)
- c) Describe one adaptation of the part labelled Z on vertebrae A (2 marks)
- d) i) Name the bone B that articulates with the rib. (1 mark)
- ii) What is the role of the bone named in (i) above in the process of blood synthesis. (1 mark
- e) Outline the necessity of support in plants. (1 mark)

SECTION B: (40 MARKS)

Answer question 6 (compulsory) and either question 7 or 8.

6. An experiment was carried out to investigate transpiration and absorption of water in a certain plant species. The plants were potted and supplied with adequate amounts of water. The amount of water lost and absorbed was determined. The results were as shown in the table below.

Time of day (in hours)	Amount of water in cm ³				
Time of day (in flours)	Transpiration	Absorption			
0700 - 0900	30	1500			
0900 - 1100	40	N 25			
1100 - 1300	48	34			
1300 - 1500	56	45			
1500 - 1700	40 0	50			
1700 - 1900	25	40			
1900 - 2100	© 15	28			
2100 - 2300	10	21			

- a) Name the:
- i) organs responsible for transpiration
- (1 mark)
- ii) cell responsible for absorption of water from the soil.
- (1 mark)
- b) Using the same axes, plot graphs of transpiration and absorption of water in cm³ against time of the day in hours.
- c) Account for the shape of the graphs of:
- i) Transpiration (4 marks)
- ii) Absorption (3 marks)
- d) At what time of the day was the amount of water the same for transpiration and absorption?
- (1 mark)
- e) Suggest what would happen to transpiration and absorption of water if the experiment was continued for another 2 hours. Give a reason for your answer. (2 marks)
- f) Name one environmental factor which affects the rate of transpiration. (1 mark)
- 7. a) Explain the factors that affect energy requirement in man. (10 marks)
 - Explain the role of auxins and Giberrilins in growth and development in plants. (10 marks)
- 8. a) Outline the changes that occur in a flower after fertilisation. (8 marks)
 - b) Describe the role of the placenta in the development of the embryo from the time of implantation to the time of birth. (12 marks)

KANDARA SUB-COUNTY FORM 4 JOINT EVALUATION

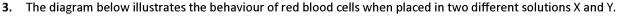
Kenya Certificate of Secondary Education

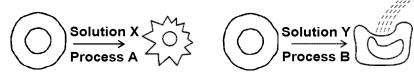
BIOLOGY

Paper - 231/1 July/August 2016 Time: 2 hours

State two ways in which the xylem vessels are adapted to their function. (2 marks)

2. Name a chemical reagent that can be used to preserve specimens. (1 mark)





Name the process represented by letter A and B. i)

(2 marks)

Identify the type of solution that would prevent processes A and B from taking place when the cells are placed in it. ii)

Draw a diagram to illustrate how a plant cell would appear if placed in solution Y. iii) (2 marks)

Define the following terms

Ecosystem (1 mark) i) ii) Community (1 mark) iii) Biomass (1 mark)

(1 mark). 0700 5.a) State the theory of evolution proposed by Jean-Baptise de Lamarck. b) State the evidences of evolution based on the following structures.

(1 mark)

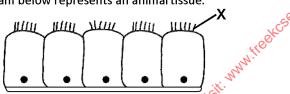
Recapitulation theory.

ii) Cell organelles (1 mark)

Describe the changes that occur in the eye during accommodation for a near object. (4 marks) 6.

Name the hormones responsible for regulation of glucose level in the blood. 7. (2 marks)

The diagram below represents an animal tissue.



Identify the tissue above.

(1 mark)

b) Suggest two roles of structure labelled X,

(2 marks)

9.a) State two features that hinder self pollination in a flower.

(2 marks)

b) State the term used to describe fruit formation in a plant without fertilization.

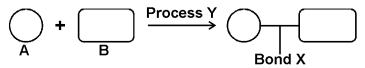
(1 mark)

10. State two ways used by marine fish to regulate their osmotic pressure.

11. a) What are the functions of semi-circular canal in the mammalian ear. (2 marks)

b) State the function of acetylcholine and cholinesterase in transmission of nerve impulses? (2 marks)

12. The process below represents the build-up of a disaccharide in living cells.



Give the name of process represented by letter Y. i)

(1 mark)

Name the bond marked X. ii)

(1 mark)

Name the end products of light stage of photosynthesis. 13.i)

(2 marks)

ii) Name the sites where dark and light reactions of photosynthesis occur.

(2 marks)

14.a) Name two tissues in plants that provide mechanical support.

(2 marks)

Name the types of joints formed by each of the following pairs of bones:

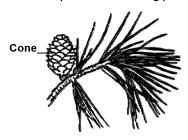
Axis and atlas.

(1 mark)

Humerus with clavicle and scapula.

(1 mark)

15. The diagram below shows a part of a flowering plant. Study it and answer the questions that follow.



a) i) To which class does the plant belong.

(1 mark)

ii) Give a reason for your answer.

(1 mark)

16. a) State two advantages of breathing through the nose rather than the mouth.

(2 marks)

b) Define tidal volume

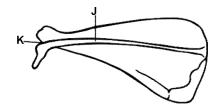
(1 mark)

- 17. The biological name of a housefly is MUSCA DOMESTICA
- i) Identify one mistake in the way the scientific name is written.

(1 mark)

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- ii) Write the name in the correct manner following all rules of Binomial nomeclature. (1 mark)
- 18. The diagram below represents a bone obtained from a mammal.



a) i) Name the bone.

(1 mark)

- i) Name the bone which articulates with the bone named in a(i) above at the cavity labelled K. (1 mark)
- 19. The diagram below shows a human tooth.



a) Identify the tooth.

(1 mark)

b) How is the tooth adapted ot its function.

(1 mark)

- 20. State two factors that affects stomatal opening.
- (2 marks)
- 21. State the economic of the following plant excretory substances.
- (2 marks)

- i) Colchicine
- ii) Papain
- 22. What is the probability of a couple with blood group A and B getting a child with blood group O. Show your working?
- 23. The following equation represents a certain biological process in living organisms.

$$2C_{51}H_{98}O_6 + 145O_2 \rightarrow 102CO_2 + 98H_2O + Energy$$

a) i) Calculate the respiratory quotient

(1 mark)

ii) Identify the type of food substrate broken down.

(1 mark)

b) Name the site of anaerobic respiration in a cell.

(1 mark)

24. The diagram below shows a germinating seedling. Study it and answer the questions that follow.



a) Name the part of the seedling labelled X.b) State the type of germination exhibited above. Explain.

25. Name the tissues in plants responsible for:

a) Transport of carbohydrates. (1 mark)

b) Primary growth (1 mark)

26. Name the organelle that secretes enzymes in a cell. (1 mark)27. State two ways in which white blood cells carry out their functions. (2 marks)

28.a) Give a reason why a woman excrete less urea when she becomes pregnant. (2 marks)

b) State two advantages of asexual reproduction in plants. (2 marks)

29. a) Give a reason why each of the following steps are followed when preparing cross sections of a leaf for examination under a microscope.

(1 mark)

(2 marks)

i) Cutting thin sections. (1 mark)

ii) Placing the sections in water. (1 mark)

30. State two adaptations of the lungs to their functions. (2 marks)

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KANDARA SUB-COUNTY FORM 4 JOINT EVALUATION

Kenya Certificate of Secondary Education

BIOLOGY

Paper - 231/2 July/August 2016 Time: 2 hours

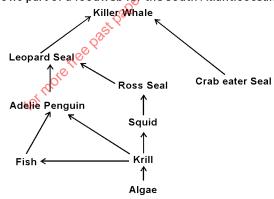
SECTION A: (40 marks)

Answer ALL the questions in this section

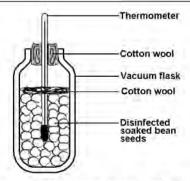
- 1. A cross between a red-flowered plant and white-flowered produced plants with pink flowers. Using letter R to represent the gene for red colour and W for white colour.
- a) What were the parental genotypes. (1 mark)
- b) Work out a cross between F1 plants. (4 marks)
- c) Give the
 - i) Phenotypic ratio of F2 plants. (1 mark)ii) Genotypic ratio of F2 plants (1 mark)
- d) Name a characteristics in humans, which is controlled by multiple genes. (1 mark)
- 2. The table below shows the approximate percent concentration of various components in blood plasma entering the kidney, glomerular filtrate and urine of a healthy human being.

Component	Plasma	Glomerular filtrate	Urine	
Water	90	90	94	
Glucose	0.1	0.1	0	
Amino Acids	0.05	0.05	0	
Plasma proteins	8.0	0.0	0	
Urea	0.03	0.03	2	
Inorganic ions	0.72	0.72	1.50	

- a) Name the process responsible for the formation of glomerular filtrate. (1 mark)
- b) What process is responsible for the absence of glucose and amino-acids in urine. (1 mark)
- c) Explain why there are no plasma proteins in the glomerular filtrate. (2 marks)
- d) Besides plasma proteins, what other major component of blood is absent in the glomerular filtrate. (1 mark)
- e) Why is the concentration of urea in urine much higher than its concentration in the glomerular filtrate (2 marks)
- f) Name one kidney disease. (1 mark)
- 3. The figure below shows part of a foodweb for the South Atlantic ocean.

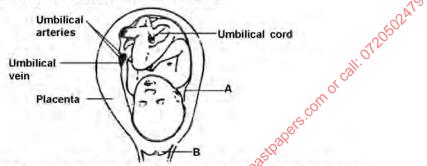


- a) i) Name the producer in this food web. (1 mark)
 - ii) Name the top carnivore in this food web. (1 mark)
- b) construct a food chain in which leopard seal is a tertiary consumer. (1 mark)
- c) In the future, the extraction of mineral resources in the Antarctic might occur on a large scale. This could destroy the breeding-grounds of the Ross seal.
 - i) State and explain the effects this might have on the population of leopard seal. (2 marks)
 - ii) List two human activities that can affect the population of organisms in the ecosystem represented by food web.
- d) Name the organism with the highest number of predators. (1 mark)
- 4. In an experiment, disinfected soaked bean seeds were put in a vacuum flask which was then fitted with a thermometer as shown in the diagram below.



The temperature readings were taken every morning for three consecutive days.

- a) What process was being investigated? (1 mark)
- b) i) What were the expected results? (1 mark)
 - ii) Account for the answer in b(i) above. (2 marks)
- c) Why were the seeds disinfected. (2 marks)
- d) Why was a vacuum flask used in the set-up. (1 mark)
- e) How would a control for this experiment be set. (1 mark)
- 5. The figure below shows a human foetus within the uterus.



- i) State two functions of the fluid secreted by structure A during pregnancy. (2 marks)
- ii) State one function of structure B during labour .(1 mark)
- iii) Give adaptations of the placenta to its function. (2 marks)
- iv) State two ways in which the composition of blood in the umbilical arteries differs from composition of blood in umbilical vein. (2 marks)
- v) Give a reason why it is necessary for frogs to lawmany eggs. (1 mark)

SECTION B (40 marks)

Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8

6. An experiment was carried out to investigate plasmolysis in onion epidermal cells. The epidermal cells were placed in different concentrations of sodium chloride solution. The percentage of plasmolysed cells was determined after 30 minutes. The results were as shown in the table below.

Salt concentration gm per 100cm3(%)	0.35	0.4	0.45	0.5	0.55	0.6	0.65
Onion epidermal cells plasmolysed(%)	0	10	30	68	82	92	100

- a) i) On the grid provided plot a graph of plasmolysed epidermal cells against salt concentration. (6 marks)
 - At what concentration of salt solution was the proportion of plasmolysed cells equal to non plasmolysed cells. (1 mark)
 - iii) State the salt concentration at which 45% of the cells are plasmolysed. (1 mark)
- b) Account for the results obtained at
 - i) 0.35 percent salt concentration. (3 marks)
 - ii) 0.65 percent salt concentration. (2 marks)
- c) i) What does the term plasmolysis mean? (1 mark)
 - ii) Name the process by which plasmolysis is reversed. (1 mark)
- d) Does plasmolysis occur in animal cells? Explain. (2marks)
- e) What is the relationship between molar concentration of the salt solutions and the percentage of plasmolysed cells
- f) What term would best describe a plant where 100% of its cell were plasmolysed. (1 mark)
- 7. Discuss the role of plant hormones. (20 marks)
- 8. a) Describe the process of exhalation in man. (6 marks)
 - b) Describe the mechanism of hearing in man. (14 marks)

KISII CENTRAL SUB-COUNTY JOINT EVALUATION TEST

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

231/1

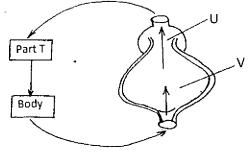
BIOLOGY

PAPER 1

TIME: 2 HRS

JULY/AUGUST 2016

- 1. a) What is cell specialisation? (1 mark)
 - b) Name two specialised cells in plants. (2 marks)
- 2. Explain what happens to glucose formed by dicotyledonous leafduring photosynthesis. (3 marks)
- 3. State three features in bisexual flower that hinder self-fertilization. (3 marks)
- 4. Give reasons why primary productivity in an aquatic ecosystem decreases with depth. (2 marks)
- 5. State two advantages of metamorphosis to the life of insects. (3 marks)
- 6. The diagram below shows circulation in fish.



ii) Name the parts labelled T and V. (2 marks)

iii) State **one** disadvantage of this type of circulation. (1 mark)

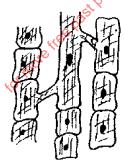
- 7. State how the following parts of the eye are suited to their functions.
 - i) Cornea (2 marks)
 - ii) Aqueous humour (2 marks)
- 8. The genetic disorder haemophilia is due to a recessive sex linked gene. A man who is haemophilia married a woman who is a carrier for the condition.
 - a) Using the letter (H) to represent the normal condition an (h) for the haemophiliaccondition.
 - i) What is the genotype of the man and woman?

(1 mark)

ii) Work out a cross between the man and woman.

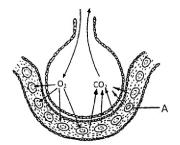
(3 marks)

9. The diagram below represents a tissue obtained from an animal.



- b) State the function of the tissue named in (a) above. (1 mark)
- 10. Explain how hairs in mammals help in keeping the body warm. (3 marks)
- **11.** In a laboratory experiment, a student observing a drop of pond water under a microscope saw and drew amoeba. The eyepiece magnification was X5 and the objective lens magnification X100.
 - a) What was the magnification of the set up? (1 mark)
 - b) If the amoeba had a diameter of 5cm at the above magnification. Calculate its actual length in micrometres. (2 marks)

12. The diagram **below** shows the exchange of gases in alveolus.



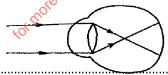
- a) State how the alveoli are adapted to their function. (3 mark
- 13. State three characteristics of merismatic cells. (3marks)
- 14. a) Name two chemical substances that form the DNA. (2 marks)
 - b) Write the base sequence of messenger RNA (mRNA) that would be coded from the DNA strand shown below. (1 mark)

- c) What is a mutation?
- 15. State three adaptations of the Red blood cells. (3 marks)
- **16.** a) State **two** functions of the xylem vessels. (2 marks)
 - b) List two structural adaptations that make xylem vessels suitable to their function.(2 marks)
- 17. Explain the following observations;
 - i) Some tropic plants are known to close their stomata during the day and open themat night.

(2 marks)

- ii) When transplanting a young plant it is advisable to remove some of the leaves (2 marks)
- 18. a) Name the chemical compound formed in the mitochondria which is the source of energy. (1 mark)
 - b) Explain why fats are not considered as the main respiratory substrate yet they yield more energy when completely oxidised than carbohydrates. (2 marks)
- 19. a) State one function of thyroxin in mammals. (1 mark)
 - b) State **one** difference between nervous and endocrine system based on the nature of response. (1 mark)
- 20. A student failed to see the field of view through the eye piece of the microscope. suggest two possible reasons for this. (2 marks)
- 21. Explain what would happen to red blood cells if plasma glucose concentration becomes very high because insulin secretion failed. (3 marks)
- 22. State two disadvantages of anaerobic respiration in animals. (2 marks)
- 23. a) Name the spore producing structures in;

 - ii) Pteridophyta (1 mark)
- 24. i) Differentiate the following convergent and divergent evolution. (2 marks)
 - ii) State **one** role played by Mutation evolution. (1 mark
- **25.** The diagram shows the position of a formed in a defective eye.



- b) How can the defect be corrected? (1 mark)
- 26. The wings of birds and those of insects are superficially similar but their internal structure is completely different.

(1 mark)

- i) Name the type of evolution that led to the **two** types of wings. (1 mark)
- ii) Give **two** other examples of this type of evolution. (2 marks
- 27. The diagram below represents a bone obtained from a mammal.



- b) Name the:
- i) Bone which articulates with the bone named in (a) above at the cavity labelled K. (1 mark)
 - ii) Joint formed by the bones

KISII CENTRAL SUB-COUNTY JOINT EVALUATION TEST

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

231/2 BIOLOGY PAPER 2

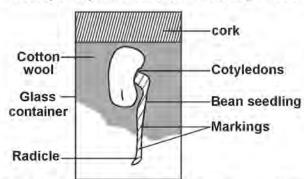
TIME: 2 HRS

JULY/AUGUST 2016

SECTION A (40 MARKS)

Answer ALL questions in this section in the spaces provided.

1. A student set up an experiment as shown in the diagram below.



a) What was being investigated in the experiment?

(1 mark)

b) On the diagram below indicate the expected results after three days. (2 max

(2 marks)

c) Why was it necessary to have wet cotton wool in the container?

(1 mark)

- d) What is the role of each of the following to a germinating seed?
 - i) Oxygen

(2 marks)

ii) Cotyledons

(1 mark)

e) Small seeds require light immediately after germination. Explain.

(1 mark)

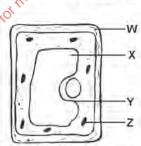
- 2. Broad and thin humans are characteristics that are inherited. When a homozygous broad lipped is crossed with a homozygous broad lipped woman, all the children in the family are broad lipped. In a particular family, a woman that is heterozygous for broad lips is married to a man whose parents were both thin lipped, using letter B to represent genes for lips.
 - a) Work out the genotypic ratio of the children in that family.

(6 marks)

b) What is the phenotypic ratio of the children in (a) above.

(1 mark)

- c) Difference between gene mapping and sequencing of gene. (1 mark)
- 3. Examine the diagram below carefully and use it to answer the questions that follow.



- a) Name the parts labelled X, Y and Z. (3 marks)
- b) State the substance by which the part labelled W is made up of.

(1 mark)

- c) Name the process by which mineral salts move into the structure labelled X. (1 mark)
- d) Explain what happens to a red blood cell when placed in distilled water. (3 marks)
- 4. Cells of a certain herbaceous plant were found to have an average diameter of 2.5mm. The cells were placed in varying concentrations of sugar solution. The average diameter of the cells in each solution was determined and the results obtained were as shown in the table below.

CONCENTRATION OF SUGAR SOLUTION (PERCENT)	DIAMETER CELLS mM
1%	5.0
5%	4.0
10%	3.0
15%	2.0

- a) From these results, determine the concentration of the cell sap.
- (1 mark)
- b) What term is given to the sugar solution whose concentration is equal to that of the sap? (1 mark)
- c) Give an explanation for the average diameter of the cells placed in 1% sugar solution compared to the normal diameter of the cells. (4 marks)
- d) Describe the difference in appearance between cell cytoplasm before and after being placed in 15% sugar solution.
- 5. In an investigation, two persons A and B drank the same amount of a strong solution of glucose. Their blood sugar levels were immediately determined and thereafter at one hour intervals for the next six hours. The results were as shown in the table below.

Time in hours	Glucose level in mg/10	0ml of blood
	Person A	Person B
0	86	110
1	225	355
2	160	320
3	92	300
4	90	260
5	90	245
6	86	215

- a) In humans, the normal blood sugar level is about 90mg/100ml of blood. Explain the change in the sugar level in person A during;
- i) The first 4 hours. (3 marks) ii) The 6th hour (2 marks)
- b) i) Suggest a possible reason for the high blood sugar levels in person **B**. (2 marks)
- ii) How can high blood sugar level in a person be controlled? (1 mark)

SECTION B (40 MARKS)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8

6. During an ecological study of a lake, a group of students recorded the following observations.

Planktonic crustaceans feed on planktonic algae

Small fish feed on planktonic crustaceans, worms and insect larvae

Worms feed on insect larvae

A bird species feeds on small fish, planktonic crustaceans and worms

Insect larvae feed on planktonic algae

Large fish feed on small fish

- a) From this record of observations, construct a food web. (5 marks)
- b) From the food web you have constructed in (a) above, isolate and write down a food chain that ends with;
- i) Bird species as secondary consumer (1 mark)
- ii) Large fish as tertiary consumer (1 mark)
- c) The biomass of the producers in the lake was found to be greater than that of primary consumers. Give an explanation for this observation. (1 mark)
- d) Using either the observations recorded by the students or the food web you have constructed, name;
- i) Two organism that complete for food in the lake. (2 marks)
- ii) **Two** sources of food the organisms in (d) (i) above compete for. (1 mark)
- e) i) State **three** ways in which humans may interfere with this lake ecosystem. (3 marks)
- ii) Explain how each of the ways you have stated above may affect life in the lake. (6 marks)
- 7. a) Define the term tropism. (2 marks)
 - b) Explain the mechanisms of various tropisms in plants. (18 marks)
- 8. Describe how the various structures of the human female reproductive system are adapted to their function. (20 marks)

KISII CENTRAL SUB-COUNTY JOINT EVALUATION TEST

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

231/3

BIOLOGY

PAPER 3

TIME: 2 HRS

JULY/AUGUST 2016

CONFINDENTIAL

Each candidate will require:

- 1. Test tube rack
- 2. Test tube holder
- 3. Mortar and pestle (can be shared)
- 4. 4ml of 1% Copper (II) sulphate solution
- 5. 4mls 10% sodium Hydroxide solution
- 6. Means of heating / Source of heat
- 7. Clean boiling tube
- 8. 10 ml measuring cylinder
- 9. Specimen P(10 pieces of dry Dagaa in a petridish)
- 10. Distilled water in a wash bottle
- 11. Empty beaker (100ml)
- 12. Four clean test-tubes
- 13. 3 ml of iodine solution
- 14. 4ml of Benedict's solution
- 15. Four droppers.
- **1.** You are provided with specimen labeled P in a Petri dish. Examine the specimen.
 - a) i) Using observable features only, state class to which the specimen belong.

(1 mark)

ii) Give two reasons for your answer.

(2 marks)

- b) Select five pieces of specimen P. Crush them in a mortar and pestile to obtain a powder. Place the crushed powder in a boiling tube. Add a small amount of distilled water and shake to mix. Decant the contents into a clean test tube.
- i) Using the reagents provided, test for the food substances in the decant. Record down your procedure, observations and conclusions in the table below. (9 marks)

Food substance	Procedure with	Observation	Conclusion
	iejt. W		

ii) What causes the following deficiency disease?

Beriberi (1 mark)
Pellagra (1 mark)
Pernicious anaemia (1 mark)

The diagram below represents a cross section of a plant stem. Study it and carefully answer the questions that follow.

a) Identify the letter that represents tissues responsible for support and name the tissues. (4 marks)

State two ways in which the tissues named in (a) above offer support. (2 mark

b) i) When iodine solution was added to part R of the section, part R stained blue black. What does this indicate about this part? (1 mark)

ii) Tissue R is also present in the roots of plants. What is the function of this tissue in roots?

(1 mark)

- c) i) If the plant from which this section was obtained had first been placed in water containing eosin dye, which part would you expect to be stained with eosin dye? (1 mark)
- ii) Name three forces which help water containing eosin to pass through the dyed tissues. (3 marks)
- d) i) Name tissue Q. (1 mark)
 - ii) What is the name of the cell S seen adjacent to tissue Q?

(1 mark)

- iii) What is the function of this cell? (1 mark)
- 3. The photograph labelled J, K and L are all related to a mammalian kidney.
 - a) Name the hormone produced by the structure labelled **P**. (1 mark
 - b) Name the parts labelled Q, R and T.

(3 marks)

- c) State the process by which wastes are filtered from blood in the structure labelled S. (1 mark)
- d) i) Give two components of blood that are not filtered at S.

(2 marks)

ii) Give two reasons why the components you have named in (d) i) above are not filtered. (1 mark)

(2 marks)

f) What two adaptations would be expected in the structure L in a desert animal like a Camel?

UGENYA - UGUNJA CLUSTER OF SCHOOLS - 2016

Kenya Certificate of Secondary Education

231/1

BIOLOGY

Paper 1

(Theory)

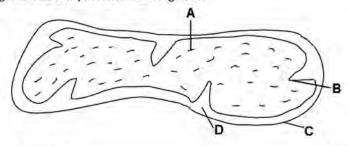
July/August 2016

Time 2 hours

Name the causative agent of Cholera.

(1 mark)

The diagram below represents a cell organelle.



a) Identify the organelle. (1 mark)

b) Name the part labelled B. (1 mark)

State the function of part labelled A.

(1 mark)

3. Explain why the following are required for active transport to take place

Oxygen

(1 mark)

ii) Enzyme (1 mark)

b) State one role of osmosis to animals.

(1 mark)

a) Explain three ways in which a red blood cell is adapted to its function.

b) State the main form in which carbon (IV) oxide is transported in mammals.

(3 marks) (1 mark)

State the functions of the following organelles.

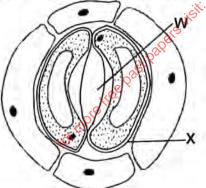
Centrioles.

(1 mark)

Nucleolus.

(1 mark)

The diagram below shows parts of plant tissues.



Name cell labelled X on a part labelled W. a)

(2 marks)

b) State two adaptations of cell labelled X to its function. (2 marks)

7. a) Distinguish between hypogeal germination and epigeal germination.

(2 marks)

b) State two conditions within the seed that causes dormancy in seed.

(2 marks)

8. a) Define polyploidy (1 mark)

b) Name three disorders resulting from gene mutation. (3 marks)

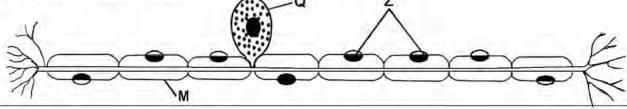
a) Distinguish between homologous and analogous structure.

(2 marks)

b) Explain the term continental drift as used in evolution.

(2 marks)

10. The diagram below represents a nerve cell



a) Identify with a reason the type of neurone above. (2 mark) b) Name the parts labelled. Q,Z (2 marks) 11 a) Name three supportive tissues in plants. (3 marks) b) Name the type of muscles found in the gut. (1 mark) 12. A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view. Define the term resolving power. (1 mark) If the student counted 20 cells across the field of view calculate the size of one cell in micrometers. (2 marks) 13. a) Distinguish between transpiration and guttation. (2 marks) b) State two importance of guttation in hydrophytes. (2 marks) (2 marks) 14. a) In what form do the following organisms remove their nitrogenous wastes. Birds i) Tadpole...... b) Explain why the concentration of urea in human urine is much higher than its concentration in the glomeruler filtrate. (1 mark) Give a reason why urine of a mammal does not contain amino acids. (1 mark) 15. a) Distinguish between respiratory quotient and oxygen debt. (2 marks) b) Name the site where anaerobic respiration occurs in the cell. (1 mark) **16.** An animal was found to have an active concentrative vacuole. Name the habitat of the animal. (1 mark) Explain your answer in (i) above. (3 marks) 17.a) Define the term natural selection. (2 marks) b) State two differences between Larmakian theory of evolution and Darwinian theory of evolution. (2 marks) 18. State one adaptation of the following parts of mammalian eye. Forea centralis. i) (1 mark) ii) Sclera (1 mark) iii) Cilliary body. (1 mark) 19. Name the cartilage found between vertebrae of the vertebral column. (1 mark) 20.a) Differentiate between gaseous exchange and ventilation. (2 marks) b) Name the respiratory sites of the following: i) (1 mark) 🞺 ii) Insects (1 mark) 21. a) State two disadvantages of sexual reproduction in animals. (2 marks) b) State **two** factors that hinder self pollination and self fertilization. (2 marks) 22. Name two major branches of Biology. (2 marks) 23. a) State the functions of the following apparatus. i) Bait trap. (1 mark) ii) **Pooter** (1 mark) 24. A certain mammal was observed to have no incisor, no canines, four premolars and six molars in the upper jaw. In the lower jaw there were six incisors, two canines, four premolars and six molars. a) Write down the dental formula for the above mammal. (1 mark) b) State the mode of feeding of the animal in (a) above. (1 mark) 25. Name the process that results to formation of tissue fluid. (1 mark)

(1 mark)

26. What is serum

UGENYA - UGUNJA CLUSTER OF SCHOOLS - 2016

Kenya Certificate of Secondary Education

231/2

BIOLOGY

Paper 2

(Theory)

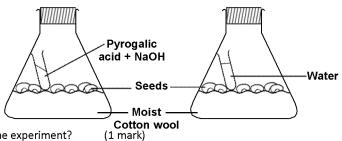
July/August 2016

Time 2 hours

SECTION A: (40 marks)

Answer ALL the questions in this section in the spaces provided.

1. In an experiment, a group of students had a set up as shown below. The set up was left at room temperature for one week.



- a) What was the aim of the experiment?
- b) Why was pyrogallic acid included in the gas jar?
- c) What results would you expect in each of the gas jar A and B at the end of the experiment? (2 marks)

d) During germination and early growth, the dry weight of endosperm decreases while that of embryo increases. Explain. (2 marks)

e) State **two** factors that contribute to the deceleration phase in the population curve of an organism. (2 marks

(1 mark)

- To estimate the population size of crabs in a certain pond, 800 crabs were caught, marked and released back into the pond, two days later, traps were layed again and 627 crabs were caught. Out of the 627 crabs were caught. Out of the 627 crabs, 111 were found to be marked.
- a) Calculate the population size of the crabs in the pond.

- (3 marks)
- b) State the three assumptions that were made during the investigation. (3 marks)
- c) Give two reasons for loss of energy from one trophic level to another in a food chain. (2 marks)
- 3.a) What osmoregulatory changes would take place in a marine amoeba if was transferred to a fresh water environment? (2 marks)
 -) i) Which two hormones exert their effect in the kidney nephron? (2 marks)
 - ii) State their functions. (2 marks)
- c) How would one find out from a sample of urine whether a person is suffering from diabetes mellitus? 2 marks)
- **4.** Haemophilia is due to a recessive gene located on the x-chromosome. A phenotypically normal man married a normal female and one of their sons was haemophiliac.
- a) Work out the genotype of the other children. Use letter H to denote the gene for normal blood clotting. (4 marks)
- b) Explain why in a human population there will be more cases of haemophilia in males than females. (2 marks)
- c) Apart from haemophilia, name one other genetic disorder of human blood caused by gene mutation. (1 mark)
- d) State the importance of vitamin in blood clotting. (1 mark)
- 5.a) State two functions of bile juice in the digestion of food. (2 marks)
- b) Name the two features that increase the surface area of small intestines. (2 marks)
- c) State the function of iron in the body. (1 mark)
- d) Explain how the following factors determine the daily energy requirements in human. (3 marks)
 - a) Age.
 - b) Occupation.
 - c) Sex.

SECTION B: (40 marks)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8

- 6. An experiment was carried out to investigate haemolysis of human red blood cells. The red blood cells were placed in different concentrations of sodium chloride solution. The percentage of haemolysed cells was determined. The results were as shown in the table below.
- a) i) On the grid provided, plot a graph of haemolysed cells againstsalt concentration. (6 marks)
 - ii) At what concentration of salt solution was the proportion of haemolysed cells equal to non-haemolysed cells?(1 mark)
 - iii) State the percentage of cells haemolysed at salt concentration of 0.45%. (1 mark)
- b) Account for the results obtained at. (6 marks)
 - i) 0.33 percent salt concentration.
 - ii) 0.48 percent salt concentration.
- c) Predict the expected observation when the red blood cells are placed in a 0.50% salt concentration? (3 marks)
- d) Explain what would be expected when plant cell is placed in the 0.33% salt concentration (3 marks
- 7. a) State the adaptations of xylem to its functions. (4 marks)
 - b) Describe the role of blood components in transport in animals. (16 marks)
- 8. a) State the functions of the mammalian ear. (2 marks)
 - b) Describe the adaptation of the mammalian ear to it's functions. (18 marks)

THARAKA NORTH /SOUTH SUB COUNTIES JOINT EXAMINATION

PAPER 1

(THEORY) BIOLOGY

JULY/ AUGUST 2016

Ĭ	Mineral element	w on mineral nutrition in plants. Function	Deficiency symptoms	3mks
1	Willieral element	Synthesis of proteins and protoplasm	Deficiency symptoms Stunted growth and vellowing of	lanvios
1	Calcium	Synthesis of proteins and protopiasin	Stunted growth and death of term	
	Calcium	Forms part of chlorophyll	Yellowing of leaves	uai vuus
ı	Explain why Larmack	s theory of evolution is not accepted by biologist	0	2mks
		sms considered to belong to the same species?		2mks
	State two functions of			2mks
		ensure cross-pollination takes place in flowering	plants.	3mks
		taken by carbon (IV) oxide released from the tis		3mks
		ares used for gaseous exchange in plants.		2mks
19		the stagnant water to control the spread of malar	ia.	
13	a) How does this pr	actice control the spread of malaria?		2mks
		y this practice should be discouraged.		1mk
		differences between biceps muscles and gut musc	cles.	3mks
		o pass out volumes of dilute urine frequently.	2 ^A	
	Name the:	40.45 40	3050	100
		on was suffering from	N. C.	1mk
	b) Hormone that wa		all.	1mk
		evidence that support the theory of evolution.	cles.	3mks
		as found that when maggots are exposed to light	the move bark to dark area.	2mks
		response exhibited by the maggets.	e.co.	
W 4		age of the response to the maggots. presents a mammalian bone.	er	
2. 1	the diagram below rep	oresents a manimanan oone.	%	
		- 585°°		
	1 Am	() es [®]		
	1	Calob		
	Car -			
		and a second		
3	a) Name the bone	it. N		
	b) Name the type of	the joint formed by the bone as its interior end v	with the adjacent bone.	Imk
3.		o have the following traits:		
13	Inconspicuous petals	Oak		
1	Long feathery stigma	25t V		
	Small, light pollen gra			
1		agent of pollination of the flower?		Imk
		ificance of the long feathery stigma in the flower		2mks
4.	Give two reasons why	primary productivity in an aquatic ecosystem de	ecreased with depth.	2mks
		eproduction is important in organisms.		3mks
		of natural selection to organisms.		2mks
7.		a found in the root nodules of leguminous plant.		1mk
		ion of the bacteria named (a) above with the legu		1 mk
8. 7	he diagram below sh	ows the position of an image formed in a defective	veeye.	
	a) Name the defect			1mk
		defect named in (a) above can be corrected.		2mks
19.		nat is produced by sebaceous glands.		1mk
		of sweat in human skin?		2mks
20.		nergy stored in muscles.		1mk
		ic importance of anaerobic respiration in plants.		2mks
		een epigeal and hypogeal germination.		2mks
21.		ecessary in the germination of seed?		2mks

	Biology p1, p2&p3
22. Name the organelle that perform each of the following functions:	<u> </u>
a) Digestion and destruction of worn out organelles.	1mk
b) Osmoregulation.	1mk
23. State the functions of each of the following parts in a microscope.	
a) The eye piece lens	1mk
b) The objective lens.	1mk
24. Briefly state two adaptations for each of the following cells to their functions.	
i) Špermatozoan.	2mks
ii) Palisade mesophyll cell	2mks
25. Name support tissues in plants characterized by the following.	
i) Cells being turgid.	1mk
ii) C ells being thickened by cellulose.	1mk
iii) Cells being thickened by lignin.	1mk
26. a) A leaf of a potted plant in darkness for 48 hours was smeared with Vaseline jelly then exposed to su	
Explain why the test for starch in the leaf was negative.	3mks
b) Name two other processes that were interfered with in the plant.	2mks
27. In an accident a victim suffered brain injury. Consequently he had loss of memory. What part of the brain	
	1mk
28. a) What is meant by the term allele?	1mk
b) Explain how the following occurs during gene mutation	
i) Deletion	1mk
ii) Inversion	1mk
c) What is test cross?	1mk
29. Name the type of skeleton that makes up each of the following animals. a) Cockroach	3mks
a) Cockroach b) bird	
c) Earthworm	
c) Lattiworm	
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28. a) What is meant by the term allele? b) Explain how the following occurs during gene mutation i) Deletion ii) Inversion c) What is test cross? 29. Name the type of skeleton that makes up each of the following animals. a) Cockroach b) bird c) Earthworm Cockroach bird c) Earthworm	

THARAKA NORTH /SOUTH SUB COUNTIES JOINT EXAMINATION

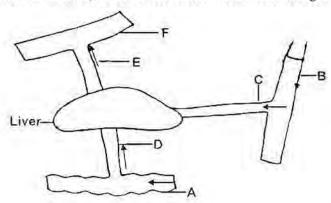
PAPER 2

(THEORY)

BIOLOGY

JULY/ AUGUST 2016

1. The flow chart below, illustrates blood circulation in certain organs in humans.



a) Name the organ labeled A.

b) Name the blood vessel labeled B and F.

c) State how the consumption of blood in vessel E differs from that in vessel.

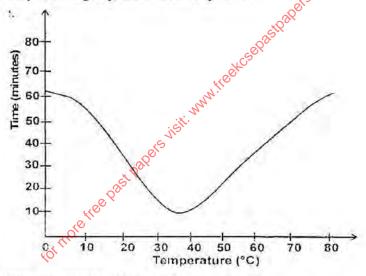
1mk 2mks

3mks

d) Name two hormones whose target is the liver when there is variation in simple carbohydrates concentration inblood.

2mks

2. In an experiment to investigate the action of pepsin on egg albumen, equal amount of pepsin were added to equal amount of egg albumen in different test tube. The test tubes were placed in water bath at different temperature. The graph below shows the time taken for the enzymes to digest protein at each temperature.



a) What is the optimum temperature for enzymes?

1mk

b) Account for the time taken to digest egg albumen at 60°C.

2mks

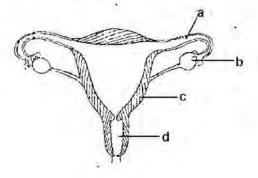
c) With reason name the form in which the enzymes pepsin is secreted.

2mks

d) State three other factors that affect enzyme controlled reactions.

3mks

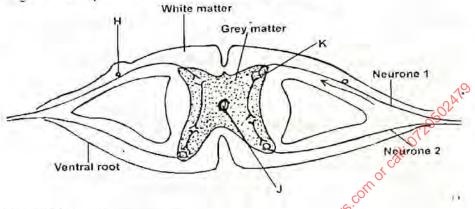
3. Study the diagram below and answer the questions that follow.



		Biology p1, p2&p3
a)	i) Which part a, b, c and d when defective after implantation may lead to abortion.	1mk
	ii) Give a reason for your answer	1mk
b)	The part labeled b can be removed after 4 months of pregnancy without interfering with the pregnancy	cy. Explain. 2mks
c)	Under each of the following diseases, state the name of c the causative agent.	
i)	Syphilis	1mk
ii)	Gonorrhea	Imk
iii)	AIDS	1mk
d)	State one disadvantages of external fertilization.	lmk
a)	What is meant by the term sex-linkage?	lmk
b)	Name two sex-linked traits in human	2mks
c)	In Drosophila Melanogaster, the inheritance of eye colour is sex-linked. The gene for red colour is dwas made between a homozygous red-eyed female. Work out phenotypic ration of F1 generation.	lominant. A cross
	(use R to represent the gene for red eyes)	5mks
 Parties .		

The diagram below represents the transverse section ofd the spinal cord.

4.



a)	Name the part labeled H.	1mk
b)	State two functions of the fluid found in part labeled J.	2mks
c)	Give a reason for colour of white matter.	1 mk
d)	Name the given function of the enzyme found at the part labeled K.	1mk

e) On the diagram use an arrow to show direction of impulse transmission along the neurone labeled 1

6. An experiment was carried out to investigate haemolysis of human red blood cells. The red blood cells were placed in different concentration of sodium chloride solution. The percentage of haemolysed cells was determined. The results were as shown in the table below.

month in the more below.		V.					
Salt concentration g/100cm ³ (%)	0.33	0,36	0.38	0.39	0.42	0.44	0.48
Red blood cells Haemolysed (%)	100	91	82	69	30	15	0

a)	i) On the	grid provided , plot a graph of haemolysed red blood salt concentration.	6mks
		at concentration of salt solution was the proportion of haemolysed cells equal to non haemolysed	
		, so	1mk
	iii) State t	ne percentage of cells haemolysed at salt concentration of 0.45%	1mk
	b) Accou	nt for the results obtained at:	
	i) 0.33 pe	ercent Salt concentration.	6mks
	ii) 0.48 pe	ercent Salt concentration.	
	c) What	yould happen to the red blood cells if they were placed in 0.50 percent Salt solution?	3mks
	d) Explai	n what would happen to onion epidermal cells if they were placed indistilled water.	3mks
7.	Explain ho	w abiotic factors affect plants.	20mks
8.	Describe he	ow excretion takes place in	
	i) Mamn	alian kidneys.	15mks
	ii) Green	plants	5mks

BURET SUB - COUNTY JOINT EVALUATION TEST

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 1

(Theory)

July/August 2016 Time: 2 hours

1.	What name	is given to a	scientist who	studies the following:
	A A WARTER THEFAULT	TO MILLOTT FOR IT	DOTOTICEDE ITALO	Studies life to the fitting.

a)	Insects	(1mark)
b)	Plants	(1mark)

c) Identification and classification of living organisms. (1mark)

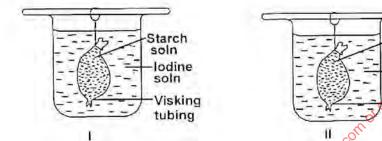
2. Which organelles would be abundant in;

a) i) Skeletal muscle cell (1mark)

ii) Palisade cell (1mark)

b) State three functions of Golgi apparatus (3marks)

 A group of students set up an experiment to demonstrate a certain process. The experiment was set up as shown in the diagram below.



After 10minutes the students recorded their observation in a table shown below.

SET UP	Observation inside the tube	Outside the tube
1	Blue-black colour	No colour change
П	No colour change	Blue-black colour

lodine

Starch

Visking

tubing

soln

soln

	a) State the process being demonstrated in the experiment?	(1mark)
	b) Explain the results in the set-up.	(4marks)
	c) What results would be expected if the experiment was repeated using starch solution which had been boil	led with dilute
	hydrochloric acid for 5 minutes?	(2marks)
4.	State two ways in which osmosis is significant to plants.	(2marks)
5.	Name the sites where light and dark reactions of photosynthesis takes place.	(2marks)
6.	a) Explain why sweat accumulate on a person's skin in a hot humid environment.	(2marks)
b)	Name the specific part of the brain that triggers sweating.	(1mark)
7.	a) On what form is energy stored in muscles.	(1mark)
	b) State the economic importance of anaerobic respiration in plants.	(1mark)
8.	Give two reasons why animals have specialized organs for excretion as compared to plants.	(2marks)
9.	State the causative agent of:	
	i) Cholera	(1mark)
	ii) Candidiasis	(1mark)
10.	State three characteristics of the class crustacean.	(3marks)
11.	Suggest three reasons why green plants are included in a fish aquarium.	(3marks)
12.	a) What is meant by the following terms;	
	i) Epigynous flower	(1mark)
	ii) Staminate flower	(1mark)
	b) How are the male parts of a wind pollinated flowers adapted to their functions?	(4marks)
13.	In an experiment the shoot tip of a young tomato plant was decapitated as shown in the diagram.	



Bi	ology p1, p2&p3
a) State the expected results after two weeks?	(1mark)
b) Give reasons for your answer in (a) above?	(2marks)
14. a) List four differences between mitosis and meiosis.	(4marks)
b) Which sex chromosomes are found in the human;	
i) Sperm cell?	(1mark)
ii) Ova?	(1mark)
15. a) Name a fat soluble vitamin manufactured by the human body?	(1mark)
b) State two functions of potassium in the human body	(2marks)
16. What happens to excess fatty acids and glycerol in the body?	(1mark)
17. Define the following terms as used in genetics;	
a) Genotype	(1mark)
b) Synapsis	(1mark)
c) Sex – linked genes	(1mark)
18. Write down the base sequence of the DNA strand from which the M-RNA strand with the following base sequ	
formed U – A – A – C – U – C – C – U	(1mark)
19. i) State two advantages characteristics caused by polyploidy in plants.	(2marks)
ii) Name the chemical that is used to artificially induce polyplidy in plants.	(1mark)
iii) Explain the mode of action of the chemicals named in (ii) above.	(1mark)
20. Give two functions of the spinal cord.	(2marks)
 21. a) Distinguish between exocrine and endocrine glands. b) Name the gland in the human body which is both endocrine and exocrine. 22. a) Name the cartilage found between the vertebrae of a mammal. b) State the functions of the above cartilage. 23. List down the different types of bones that form the axial skeleton. 24. State three characteristics of monera that are not found in other kingdoms. 25. a) What is meant by the term adaptive radiation? b) Give the expect of Lamprok's theory that is valid and explain why it is not recentable today by scientists. 	(1mark)
22. a) Name the cartilage found between the vertebrae of a mammal.	(1mark) (1mark)
b) State the functions of the above cartilage.	(3marks)
23. List down the different types of bones that form the axial skeleton.	(4marks)
24. State three characteristics of monera that are not found in other kingdoms.	(3marks)
25. a) What is meant by the term adaptive radiation?	(1mark)
b) Give the aspect of Lamarck's theory that is valid and explain why it is not acceptable today by scientists.	(2marks)
26. Name the types of response exhibited by;	(2marks)
a) Leaves of Mimosa pudica when they fold after being touched?	(1mark)
b) Give the aspect of Lamarck's theory that is valid and explain why it is not acceptable today by scientists. 26. Name the types of response exhibited by; a) Leaves of Mimosa pudica when they fold after being touched? Leaves of Mimosa pudica when they fold after being touched?	(111111)
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BURET SUB – COUNTY JOINT EVALUATION TEST

KENYA CERTIFICATE OF SECONDAY EDUCATION (K.C.S.E)

BIOLOGY

PAPER 2

b)

5.

July/August 2016

Time: 2 hours

- When pure breeding black guinea pigs were cross with pure breeding white guinea pigs, the offsprings had a coat with black and white patches
- Using letters G to represent the gene for black coat colour and letter H for white coat colour. Work out the genotypic ratio of (5marks)
- b) State the phenotypic ratio of F₂.

(1mark)

Name the term used when two alleles in heterozygous state are fully expressed phenotypically in an organism. c)

(1mark)

ii) Give an example of a trait in human beings where the condition whose term is named in c(i) above expressed itself.

(3marks)

(1mark)

- i) Explain the changes that take place in the pupil and iris of a human eye when a person moves from a dark room to a 2. a) room with bright light. (3marks)
 - ii) What is the significance of the changes explained in (a) above.
 - How does the human eye obtain nutrients. (3marks) (1mark)
- Explain why images that form on the blind spot are not perceived. Explain what happens to excess amino acids in the liver of humans.
 - (3marks) (3marks)
- Which portion of the human nephrons are only found in the cortex? b)
 - What would happen if a person produced less anti-diuretic hormone? (1mark)
- What term is given to the condition describe in (c) (i) above?

(1mark)

(5marks)

The equation below represents a process that takes in plants.

 $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

- Name the process (1mark) b) State two conditions necessary for the process to take place. (2marks)
- State what happens to the end-products of the process. c)
- Name the causative agent for the following respiratory diseases. a)
- Whooping cough (1mark) i)
- ii) Pneumonia (1mark)
- b) Describe how oxygen in the alveolus reaches the red blood cells. (4marks)
- c) Explain two characteristics of a respiratory surface. (2marks)

SECTION B

Answer questions 6 (compulsory) and either question 7 or 8.

In the experiment to determine the effect of ringing on the concentration of sugar in phloem, a ring of bars from the stem of a tree was cut and removed. The amount of sagar in grammes per 16cm³ piece of bark above the ring was measured over a 24 hour period. Sugar was also measured in the bark of a similar stem of a tree which was not ringed. The results are shown in the table below.

Time of day	Amount of sugar in grammes per 16cm ³ piece of bark	
	Normal stem	Ringed stem
06:45	0.78	0.78
09:45	0.800	0.91
12:45	0.81	1.00
15:45	0.80	1.04
18:45	0.77	1.00
21:45	0.73	0.95
00:45	0.65	0.88

Using the same axes, plot a graph of the amount of sugar against time. (6marks) At what time was the amount of sugar highest in the b)

i) Ringed stem (1mark) Normal stem (1mark) ii)

How much sugar would be in the ringed stem if it was measured at 03:45 hours? (1mark) Give reasons why there was sugar in the stems of both trees at 06:45 hours. d) (2marks)

Account for the shape of the graph for the tree with ringed stem between: e)

06:45 hours and 15:45hours (3marks) i) 15:45hours and 00:45hours ii) (2marks)

Name the structures in the phloem that are involved in the transmission of sugars. (2marks) Describe how the human kidney functions. (20marks)

Describe the process of fertilization in a flowering. (13marks)

State the changes that take place in a flower after fertilization. (7marks)

REVISION EXERCISE

KUWED JOINT ASSESSMENT EXAMINATION - 2016

Kenya Certificate of Secondary Education

231/1

BIOLOGY

PAPER 1

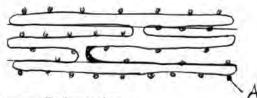
JULY/AUGUST 2016

TIME 2 HOURS

1. What is meant by the term Oxygen debt?

(2 mks)

2. Study the structure below and answer the questions that follow



a) Name the organelle drawn above

(1 mk)

b) State the function of structure marked A

(1 mk)

In an experiment, the pituitary gland of a rat was removed.

(1 mk)

State the effect it will have on the quantity of urine produced by the rat.
 Give reasons for your answer in (a) above.

(2 mks)

 The alveolus and buccal cavity of Amphibians are used for gaseous exchange. State three features they have in common that facilitates their funtion.

5. State the functions of the following parts of a light microscope

a) Diaphragm

(1 mk)

b) Condenser

6.

(1 mk)

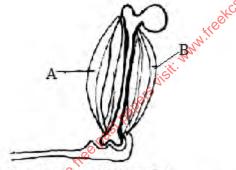
a) Give two roles of DNA

(2 mks)

b) State two structural differences between DNA and RNA.

(2 mks)

7. Study the diagram below and answer the questions that follow.



a) Name the muscles marked A and B (2 marks)

b) What happens to each muscle as the arm is straightened. A and B (2 mks)

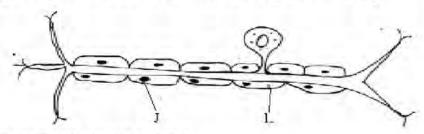
8. a) Define the term organic evolution

(1 mk)

b) Give two examples of vestigial structures in humans.

(2 mks)

The diagram below illustrates a nerve cell. Study it carefully and answer the quesions that follow



a) Name the type of nerve cell illustrated

(1 mark)

b) Give a reason for your answer in a above.

(1 mark)

c) Identify the part marked J

(1 mark)

10. Explain why;

a) Mammalian testes hang outside the body

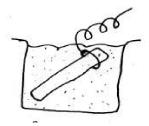
(2 marks)

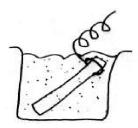
그렇게 다시 하다면 살이 되었다. 그 아이들은 아이들은 아이들은 사람이 없는 것이 없는데 없었다.

Four months after fertilization, ovaries can be removed from a human female, without terminating pregnancy

(2 marks)

11. Form one student of Kuwed Secondary school arranged the apparatus as shownbelow.



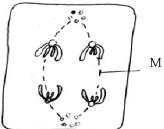


10% sugar solution

50 % sugar solution

Two strips A and B above were cut from a tradescantia whose cell sap had 30% sugar concentraion. Strip A was placed in 10% sugar concentration and B in 50% sugar concentration.

What change was expected in strip A and B. (2 marks) Account for the results in Strip A (2 marks) 12. Suggest three reasons why green plants are included in a fish aquarium. (3 marks) 13. Give the meaning of the following terms as used in ecology a) Eutrophication (2 marks) Ecosystem (2 marks) 14. Explain how you can determine the genotype of an organism (2 marks) 15. Explain how the carnassial teeth of a dog are adapted to their functions. (2 marks)



16. The diagram below represents a stage during cell division

Identify the stage of cell division

(1 mark)

ii) Give two reasons for your answer in a(i) above

(2 marks)

What would be the effect of adding colohicine to the cell above?

(1 mark)

- 17. Give the function of the following parts of a human eye.
 - Lens

(1 mark)

Cilliary bodies b)

(1 mark)

Cornea

- (1 mark)
- 18. A shoot of seedling exposed to light on one side bends towards the source of light asit grows
 - Name the response exhibited by the shoot of the seedling

(1 mark)

Explain how the bending towards the source of light occurs.

(3 marks) (2 marks)

19. Distinguish beween epigeal and hypogeal germination. 20. a)

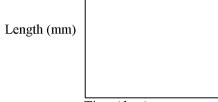
(1 mark)

State the role of mucus in digestion.

Give three adaptations of ileum to its functions

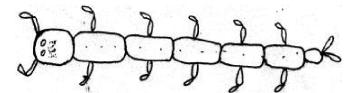
- (3 marks)
- 21. Using the axes provided below, sketch a curve to illustrate the growth pattern observed in member of phylum Arthropoda.

(2 mks)



Time (days)

22. Study the diagram below and answer the question that follow.



	Biology p1, p2&p
a) Identify the class to which the organism belongs	(1 mk)
b) Give reasons for your answer in (a) above.	(2 mks)
List two factors that aid blood flow in veins.	(2 mks)
Study the diagram below and answer the question that follow	(
P Leaf Epidermis	
a) State the name of the parts marked Q and R	(2 mks)
b) Mention the characteristics of the cells found at the part marked P. State the function of the following minerals in human	(2 mks)
a) Phosphorous	(1 mk)
a) Phosphorous	(1 mk)
b) Sodium	(1 mk)
c) Zinc Study the diagram below and answer the question that follow	(1 mk)
b) Mention the characteristics of the cells found at the part marked P. State the function of the following minerals in human a) Phosphorous b) Sodium c) Zinc Study the diagram below and answer the question that follow Sphincter X. Or Department of the function of the following minerals in human a) Phosphorous b) Sodium c) Zinc Study the diagram below and answer the question that follow Sphincter X. Or Department of the function of the func	
a) Give the name of the sphincter marked X.	(1 mk)
of that type of inducte up spiniteter (*).	(1 mk)
c) State two functions of the muscular stomach walls.	(2 mks)

KUWED JOINT ASSESSMENT EXAMINATION - 2016

Kenya Certificate of Secondary Education (K.C.S.E)

BIOLOGY

PAPER 2

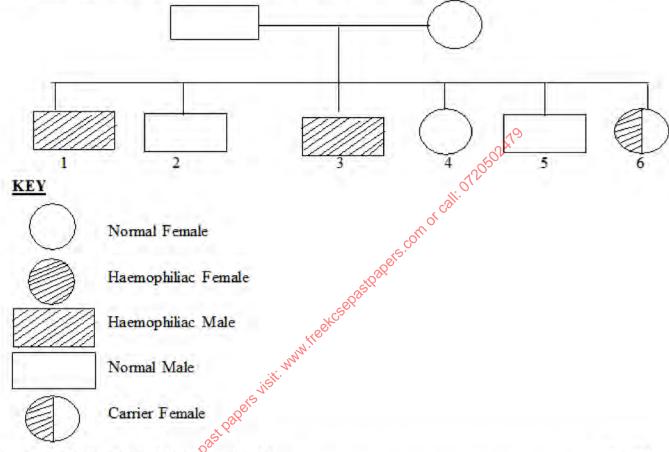
JULY/AUGUST 2016

TIME 2 HOURS

SECTION A (40 Marks)

Answer all the questions in the spaces provided below

- 1. a) Name one human disorder caused by gene mutation and is not sex-linked (1 mark)
 - b) Study the genetic chart below showing inheritance of a gene responsible for haemophilia in a family. Use capital (H) to represent the gene for normal condition and (h) to represent the genes for haemophilia.



Write the genotypes of individual numbered 1

(1 mark)

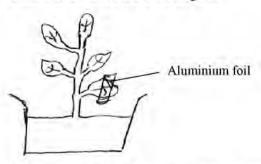
Supposed a family member 6 marries haemophilic male, what will be the phenotypic ratio of the offspring.
 Show your working

(4 marks)

Explain why there are more haemophilic males than females in a population.

(2 marks)

 In an experiment to investigate a factor affecting photosynthesis, a leaf of a potted plant which had been kept in the dark overnight was covered with aluminium foil as shown in the diagram.



The set-up was kept in sunlight for 3 hours after which a food test carried out on the leaf.

a) Which factor was being investigated in the experiment.

(1 mark)

b) i) State the results of the food test

(2 marks)

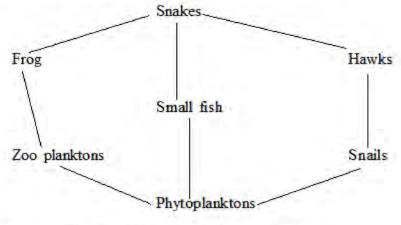
ii) Account for the results in C(i) above

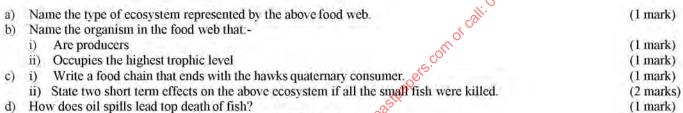
(2 marks)

Explain what happens during the light stage of photosynthesis.

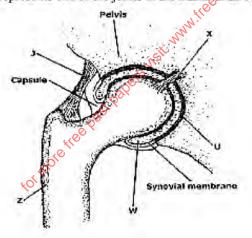
(3 marks)

			Biology p1, p2&p3
3.	a)	What is the difference between Darwinian and Lamarckian theories of evolution?	(2 marks)
	b)	What is meant by the following terms?	
	i)	Homologous structures	(1 mark)
		Example	(1 mark)
	ii)	Analogous structures	(1 mark)
		Example	(1 mark)
	c)	Explain how studies of fossils records provide evidence for organic evolution.	(2 marks)
4.	The	e diagram below represents a feeding relationship in an ecosystem	





e) Name another cause of water pollution apart from oil spills.
 5. The diagram below represents one of the joints in the mammalian body



a)	Name the type of joint shown in the diagram	(1 mark)
	 State two characteristics of the joint named in 5 a (i) above. 	(2 marks)
b)	Name each of the parts labelled Z and U	(2 marks)
c)	Name two parts of the body where this types of joint is found.	(2 marks)
d)	State one function of the fluid found in W.	(1 mark)

SECTION B (40 MARKS)

Answer question 6 (compulsory) and either question 7 or 8

6. Some sudents used a model to determine the effect of sweating on human body temperature. Two boiling tubes A and B were filled with hot water. The temperature of water in the tubes was taken at the start of the experiment and then at 5 minutes interval. The surface of ube A was continously wiped with a piece of coton wool soaked in methylated spirit. The results obtained are as shown in the table below.

(1 mark)

		Temperature ⁰ C i	n tubes	
	Time (Minutes)	A	В	
	0	80	80	
	5	54	67	
	10	40	59	
	15	29	52	
	20	21	47	
	25	18	46	
a)	On the same set of ax	es, plot a graph of ten	perature of waer in the tubes against time	(8 marks)
b)	At what rate was the	water cooling in tube	A_{\cdot}	(2 marks)
c)	Why was tube B inclu	ided in the set up.		(1 mark)
d)	Account for the rate of	f cooling in tube A.		(3 marks)
e)	State one process of h	eat loss in tube B.		(1 mark)
f)	What would be the ex	pected results if tube	A was insulated.	(1 mark)
g)	What would the insul	ation be comparable to	o in	
	i) Birds			(1 mark)
	ii) Mammals			(1 mark)
h)	Name the structures in	n the human body that	detect	
	i) External tempera	ture changes		(1 mark)
	ii) Internal temperati	ıre changes		(1 mark)
7.	Describe the process	of gaseous exchange i	n a mammal.	(20 marks)
8.	a) State the various	causes of seed dorman	n a mammal. ncy. process of seed germination.	(8 marks)
	b) Describe various	factors that affect the	process of seed germination.	(12 marks)
			· · · · · · · · · · · · · · · · · · ·	

In M I specimen N Specimen Q - Medium sized fish Subsance L - Ethanol/ Ethyl alcohol (10 ml for each student) A filter paper Filter funnel 100ml glass beaker 3 test tube 10 A test tube rack 1 10 ml measurin 2 Distill

- 12. Distilled water in a wash bottle

Each student should have access to the following

- 1. Benedicts Reagent
- 2. Iodine Reagent
- 3. Ethanol
- 4. Source of heat

- 1. Specimen K should have been freshly harvested hence retaining its turgidity.
- 2. Specimen M is a bean seed planted in a dark room 12 days before the experiment.
- 3. Specimen N is a bean seed planted in a well lit room, 12 days before the experiement.
- 4. Specimen Q one specimen should be accessible to about 10 students.

KUWED JOINT ASSESSMENT EXAMINATION - 2016

231/3

BIOLOGY

PAPER 3

JULY/AUGUST 2016

TIME 1 1/2

- You are provided with Specimen K. Use it to anser the questions that follow:-
- Name the agent of pollination of specimen K. a)

(1 mk)

Give a reason for your answer in a (i) above

(1 mk)

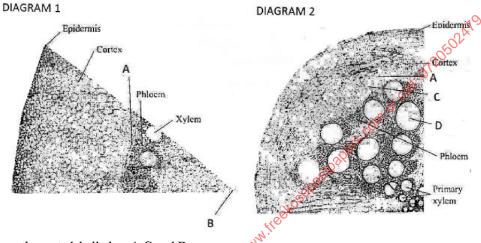
iii) Describe the gynoecium of specimen K

(3 mks)

Extract the petals from the specimen K and using a mortal and pestle, crush the petal and then add substance L to the exract. b) Filter the mixture to obain the filtrate, using the reagents provided carryout food test and complete the table below.

Food Substance	Procedure	Observation	Conclusion

2. Study the diagrams below and answer the questions that follows:-



a) Name the parts labelled A,C and D (3 marks)

Give the functions of the part labelled B

(1 mark) (2 marks)

Give any two differences between diagram 1 and 2. Using observarable features give the class from which diagram 2 was obtained

(2 marks)

c) Give two symptoms of anaphylaxis reactions

- (2 marks)
- You are provided with specimens labelled M and N that were grown under different conditions. Use them to answer the questions that follows:-
 - Name the conditions under which the specimens were grown M and N

(2 marks)

Give four observable differences between specimen M and N.

(4 marks)

iii) Name the phenomenon exhibited by specimen M and its biological significance

(1 mark)

Phenomenon Biological significance

- (1 mark)
- You are provided with specimen O. Study it carefully and answer the questions that follows:-
 - Name the class to which specimen Q belongs and give a reason for your answer Class

(1 mark) (1 mark)

Reason

(3 marks)

Calculate the tail power of specimen Q

(3 marks)

iii) Explain how the respiratory surface of specimen Q is adapted to its functions.

IGEMBE SOUTH FORM FOUR END OF SECOND TERM EXAM

Kenya Certificate of Secondary Education

BIOLOGY

Paper - 231/1 July/August 2016 Time: 2 hours

1.a) Differentiate between chromosmal mutation and gene mutation.

(2 marks)

What type of mutation causes sickle cell anaemia?

(1 mark)

2. The table below shows the concentration of some ions in pond water and in the cell sap of an aquatic plant growing in the pond.

lons	Concentration in pond water	Concentration in cell sap
Sodium	50	30
Potassium	2	
Calcium	15	1
Chloride	180	200

a) Name the process by which the following ionscould have been taken up by the plant.

i) Sodium ions

(1 mark)

ii) Potassium ions

(1 mark)

b) For each of the process named in a(i) and (ii) above, state one condition necessary for the process to take place.(2 marks)

3. Name two cellular components of blood.

(2 marks)

4. Below is a list of organisms which belong to classes insecta, chilopoda, Diploda and Arachnida; Tick, centipede, tsetse fly, millipede place the organism in their respective classes in the table below. Give a reason (4 marks)

millipede pi	ace the organism in their respec	tive classes in the table below.	Givea reason	(4 marks
Class	Organism	ctipal	Reason	
Insecta		_E Q ²		
Chilopoda		Seko		
Diplopoda		in white		
Arachnida		.cit. W		

5. Name three sites where gaseous exchange takes place in terrestrial plants.

(3 marks)

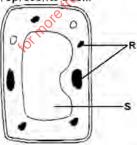
6.a) Distinguish between epigeal and hypogeal germination.

(1 mark)

b) Name two factors that cause dormancy in seeds?

(2 marks)

7. The diagram below represents a cell.



a) Identify the cell.

(1 mark)

Give a reason for your answer in 7(a) above.

(1 mark)

c) Name the parts labelled R and S.

(2 marks)

8. a) The action of ptylin stops at the stomach. Explain,

(1 mark)

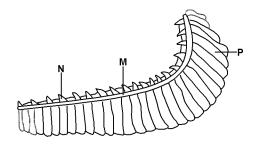
b) State a factor that denatures enzymes,

(1 mark)

c) Name the features that increase the surface area of small intestines.

(2 marks)

9. The diagram below represents an organic from a bonny fish, study it and answer the questions that follow.



a) Name parts I	label	led	N,	Μ.
-----------------	-------	-----	----	----

(2 marks)

b) State the function of the part labelled P. (1 mark)

(1 mark)

c) How are the structures labelled P adapted to their functions? 10. Give the name of the study of

(4 marks)

- a) The cell
- b) Microorganism
- c) Insects
- d) Fungi
- 11. The equation below represents a metabolic reaction that occurs in themammalian liver. Amino acid ® organic compounds + urea.
- a) Name the process.

(1 mark)

What is the importance of the process to the mammal? b)

(1 mark)

What is the source of amino acids in this process. c)

(1 mark) (1 mark)

What is the difference between essential and non-essential amino acids? d)

12.a) What is meant by

i) Artecology.

(1 mark)

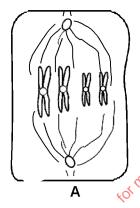
ii) Synecology.

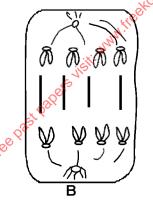
(1 mark)

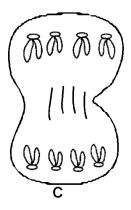
State two ways in which schistosoma species is adapted to parasitic mode of life. b)

(2 marks)

13. The diagrams below represents some stages in mitosis.







- Name the stages represented by the diagrams labelled A, B, C a)
- (3 marks)

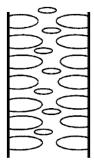
b) State the significance of mitosis to an organism (1 mark)

14.a) Explain why Lamarck's theory of evolution is not accepted by biologist today.

(1 mark) (3 marks)

State three pieces of evidence that support the theory of evolution.

15. The diagram below shows a type of thickening found in xylem vessels.



Name the type of thickening shown above.

(1 mark)

- b) Name the main chemical substance that forms the thickening in these vessels.
- (1 mark)

16. State causative agent of the following diseases.

- (4 marks)
- Tuberculosis a)
- b) Bilharzia
- c) Cholera
- d) Malaria
- **17.** The following equation, summarises two chemical reactions.

Carbon (IV) oxide + water + energy Glucose + oxygen

Name the reaction indicated by arrow A

(1 mark)

Name the cell organelle in which reaction A occur. b)

(1 mark)

18. The diagram below represents a mammalian bone.



Name the bone. a)

(1 mark)

b) Name the type of Joint formed by the bone at its anterior end with adjacent bone,

(1 mark)

- 19.a) State what is meant by the term respiratory quotient (R.Q)
- Complete the following equation for the aerobic respiration of compound A

(1 mark)

$$C_{55}H_{100}O_6 + 77O_2 \rightarrow$$

The diagram below represents a simple life cycle of common biological processes.



a) Identify the product labelled B.

(1 mark)

b) State three differences between process I and II (3 marks)

(2 marks)

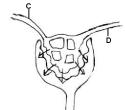
21. State two functions of human ear

(2 mraks)

- **22.a**) Other than sugars name two compounds that are translocated in phloem.
- The chart below is a summary of the blood clothing mechanism in man
- (1 mark)
- i) Name the blood cells represented by X. The end product of the mechanism represented by Z. ii)

(1 mark)

Below is a diagram of a part of mammalian nephron.



Name the parts labelled C and D. a)

(2 marks)

Name the process indicated by arrows (®) in the diagram. b)

(1 mark)

a) What is meant by the term allele?

(1 mark)

b) State the function of deoxyribonucleic acid molecule?(DNA)

(1 mark)

25. Name hormone responsible for apical dominance.

(1 mark)

IGEMBE SOUTH FORM FOUR END OF SECOND TERM EXAM

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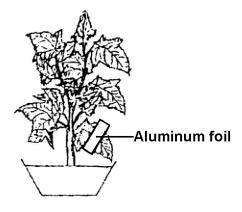
BIOLOGY

Paper - 231/2
July/August 2016
Time: 2 hours

SECTION A: (40 marks)

Answer ALL the guestions in this section in the spaces provided.

- 1.a) What do you understand by the term 'sex linkage'? (1 mark
- b) Name two sex linked traits that are linked to the Y-chromosome; (2 marks)
- c) A normal woman (carrier) marries a colour-blind man. Work out the probability of the couple giving rise to a colour-blind daughter. Show your working use letter H for colour-blindness trait. (5 marks)
- 2. In an experiment to investigate a factor affecting photosynthesis, a leaf of a potted plant which had been kept in the dark overnight was covered with aluminium foil as shown in the diagram below.

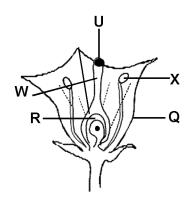


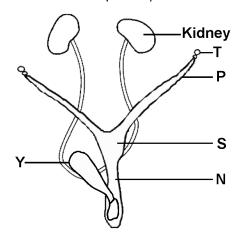
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The set up was kept in sunlight for three hours after which a food test was carried out on the leaf.

- a) Which factor was bring investigated in the experiment? (1 mark)
- b) Which food test was carried out? (1 mark)
- c) i) State the results of the food test. (2 marks)
 - ii) Account for the results in c(i) above.
- (2 marks)
- d) Why was it necessary to keep the plant in darkness, before the experiment? (1 mark)
- e) Why was aluminium foil used in the experiment. (1 mark)
- **3.a)** A diabetic person and non-diabetic person each ate the same amount of glucose, one hour later, the glucose concentration in the blood of the diabetic person was higher than that a of the non-diabetic person. Explain why? (2 marks)
- b) Explain why the urine of a non-diabetic persons does not contain glucose. (2 marks)
- c) Suggest how a high blood glucose concentration could cause glucose to be the present in the urine of a diabetic person.

 (1 mark)
- d) If the glomerular filtrate of a diabetic person contains a high concentration of glucose; he produces a large volume of urine. Explain your answer. (2 marks)
- e) In some forms of Kidney diseases, proteins from the blood plasma are found in the urine. Which part of the nephron would have been damaged by the disease to cause proteins from blood plasma to be present in the urine. (1 mark)
- 4. Figure 1 and 2 below represent reproductive organ of plants and an animal respectively.





Biology p1, p2&p3 Which letter in figure 1 and 2 represents the organs that produce female gametes? (2 marks) a) What is function of the structure labelled S? b) (1 mark) c) Name the structure labelled W? (1 mark) Which letters is figure 1 and 2 represents the structure where fertilization takes place. (1 mark) e) Which letter in figure 1 represents the structure where male gametes are produced? (1 mark) f) Explain how the following prevent selfpollination Protoandry (1 mark) ii) Self-sterility. (1 mark) In an experiment, a group of students set up four glass jars as shown in the diagram below. Jar A, B and C were maintained at 25°C for 7 days, while jar D was maintained at 0°C for the same period of time. Pyrogalie acid wool wool What was this set up supposed to investigate? (1 mark) a) b) Why was pyrogallic acid included in glass Jar A. (1 mark) Explain why glass Jar C and D were included in the experiment? (2 marks) c) d) What results would you expect in glass jar A and B at the end of the experiment? State two artificial ways of breaking seed dormancy. (2 marks) SECTION B (40 marks) Answer questions 6 (compulsory) in the spaces provided and either 7 or 8 in the spaces provided after question 8. 6.a) In an ecological study, a grasshopper population and that of crows were estimated in a certain grassland area over period of one year. The results are as shown in the table below. i) What is the relationship between the rainfall and grasshopper population? (1 mark) Account for the relationship stated in a(i) above. (3 marks) b) Explain the relationship between the grasshopper population and that of crows? If the data was used in the construction of pyramid of numbers, what would be the tropiclevel of (3 marks) ii) Crows If the studied area was one square kilometer state: one method that could have been used to estimate the crow population. (1 mark) ii) one method that could have bee used to estimate the grasshopper population. (1 mark) Suggest what would happen if a predator for grasshopper entered the study area. (2 marks) e) f) What is meant by the carrying capacity? (1 mark) Why would the carrying capacity of wild animals in woodland grassland be higher than that of cattle? g) (2 marks) What is an ecosystem? (1 mark)

State two causes of water pollution

How is the human eye adapted to its functions? (20 marks)

b) What are the adaptations of the Red blood cells to their functions.

(2 marks)

a) Discuss movement of a molecule of water from the soil to the atmosphere in plants.

1)

7.

8.

(14 marks)

IGEMBE SOUTH FORM FOUR END OF SECOND TERM EXAM

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BIOLOGY

Paper - 231/3
July/August 2016
Time: 2 hours

CONFINDENTIAL

Each candidate will require:

- 1. W A maize seedling with first foliage leaves grown in the dark (it should have remains of grain)
- 2. White tile
- 3. Glass rod
- 4. Scalpel / razor
- 5. Iodine solution
- 6. Benedict's solution
- 7. 4 test-tubes
- 8. Test tube rack
- 9. Test -tube holder
- 10. Means of heating
- 11. The school get confidential atleast 10 days before the practical
- 1. You are provided with a specimen W which was grown in the dark. Examine the specimen
- a) Draw and label all observable parts of the specimen.
- b) State the functions of any two parts you have labelled. (2 marks)
- c) Cut off the shoot and keep the rest of the specimen for use in question (d). Crush the shoot on a white tile using a glass rod. Carry out the following food tests. Record your observations and conclusions in the table below. (2 marks)

(3 marks)

	TEST	OBSERVATION	CONCLUSION
I)	Add a drop of iodine solution to a portion of the crushed shoot on a white tile	sapastpapers	
i)	Place another portion of the crushed shoot in a test tube. Add 3 drops of benedict's solution. Shake the mixture and heat	ist wan heeke	

d) Remove the grain from the remaining part of the specimen. Crush it and carry out the following tests. Record your observations and conclusion in the table (pelow. (2 marks)

	TEST	OBSERVATION	CONCLUSION
1.	Add a drop of iodine solution to a portion of the crushed grain on the white tile.		
	Place another portion of the crushed grain in a test tube. Add 1cm ³ of Benedict's solution. Shake the mixture and heat.		

- e) Account for your results in (c) and (d) above (4 marks)
- 2.a) Examine photograph A, B1 and B2 carefully and answer the questions that follows. B2 was extracted from B1

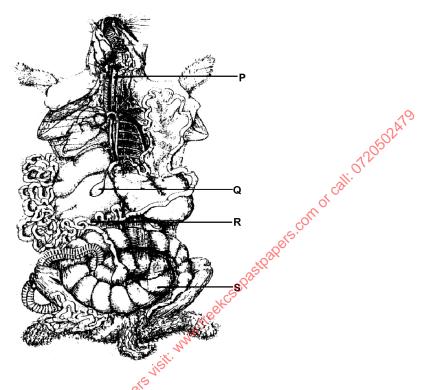






A B1 B2

- i) What name is given to the coiled part labelled T found on specimen A. (1 mark)
- ii) Name the type of response exhibited by the coiled part on specimen A. (1 mark)
- iii) Name the stimulus responsible for the response named in (ii) above. (1 mark)
- iv) Explain how the response exhibited by the coiled part on specimen A occurred. (3 marks)
- v) State the biological significance of the response described in (iv) above to the survival of the specimen. (1 mark)
- b) Use photograph specimen labelled B1 and B2 above to answer the questions below.
- i) State the agent of pollination for the specimen above. (1 mark)
 - ii) Give a reason for your answer. (1 mark)
- iii) Describe the external features of the leaves of the specimen B2. (2 marks)
 - iv) Based on the floral parts, state the class to which specimen B belongs. (1 mark)
 - v) Give a reason for your answer in (iv) above. (1 mark)
- 3. Below is a diagram representing a dissection of an organism, study it and answer the questions below.



- a) Name the parts labelled P and Q (2marks)
- b) From the observable features only, explain the adaptations of parts labeled R to its functions.
- c) Identify and explain the role of the part labelled S

Identify S. (1 mark)

Explain the role of S. (1 mark)

d) With reason, classify the organism into; (4 marks)

i)	Kingdom
Rea	ison
ii)	Class
	oson

- e) i) In the diagram identify the heart and the trachea. (2 marks)
 - ii) State the adaptations of the trachea to its functions. (2 marks)