312 / 1
GEOGRAPHY
Paper 1
End of Term 1 2018

Time: 2 ¾ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

312/1
Geography paper 1

INSTRUCTIONS TO CANDIDATES

- This paper consists of two section; A and B
- Answer ALL questions in section A
- In section B answer question 6 and any other two questions

This paper consists of 4 printed pages

Candidates should check the question paper to ensure that all the printed as indicated and no questions are missing.

SECTION A

Answer all the questions in this section

1 a) Differentiate between longitudes and latitudes. (2mks)

  b) Mention the characteristics of the low pressure belt around latitude 0°. (3mks)

2. a) The diagram below represents the earth on its axis, use it to answer question (a)
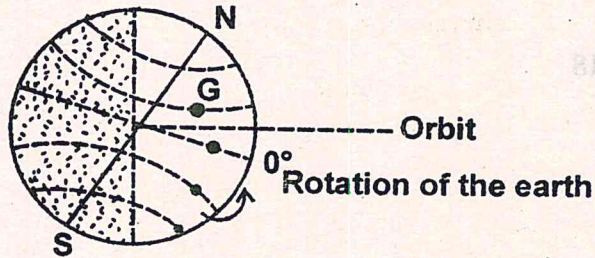
  i) Name the latitude marked G. (1mk)

  ii) What is the angle of inclination of the earth's axis from it's orbit. (1mk)

  b) State three effects of the movement of the earth on it's own axis once every 24 hours. (3mks)

3 a) What is clastic load. (2mks)

  b) Highlight three conditions that facilitate formation of deltas. (3mks)

4. The diagram below represents a coastal landform.
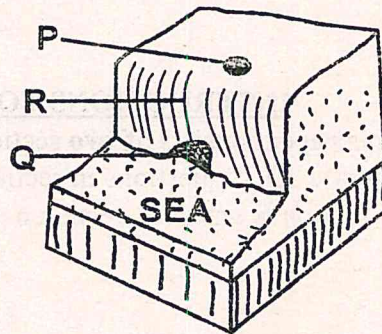
  a) Name the features marked P, Q and R. (3mks)

  b) State two conditions necessary for the formation of a spit. (2mks)

5 a) State three reasons why wind is the dominant agent of erosion in arid areas. (3mks)

  b) Identify two features formed as a result of wind deposition. (2mks)

Study the map of Migwani (1:50,000) sheet 151/1 and use it to answer question 6 .

6 a) i) Convert the ratio scale of the map into statement scale (show your calculations) (2mks)

   ii) Give two methods used in the map extract to represent relief. (2mks)

   iii) Give the adjoining sheets to the North of Migwani sheet. (1mk)

  b) i) Give the physical features found in grid square 9481. (2mks)

ii) Give the six figure grid reference for Itoloni Dam. (1mk)

iii) Describe the drainage of the area covered by the map. (4mks)

c) Calculate the area bordered by all weather road C94 and dry weather road D502 in the Nothern part of the area covered by the map extract. Give your answer in square kilometres. (2mks)

d) Apart from forest; name two other types of natural vegetation found in the area covered by the map. (2mks)

e) Using a vertical scale of 1cm rep 20m, draw a cross section along northing 80 from easting 91 to 97. (5mks)

    i) On your cross section, mark and name:
       All weather road (Bound surface) (1mk)
       A. hill (1mk)
    ii) Calculate the vertical exaggeration of the cross section. (2mks)

7. The table below shows some characteristics of igneous rocks.

Category	Level of formation	Rate of cooling	Size of crystals	Examples
Intrusive	Great depth	Slow	D	Granite
A	Shallow depth	Moderate	Medium	Dolerite
Extrusive	B	C	Small	Pumice

a) Fill in the missing characteristics A, B C and D which describe the different types of igneous rocks.

A - (4mks)
B -
C -
D -

b) Describe three ways through which sedimentary rocks are formed. (6mks)

c) Some students are planning to carry out a field study on metamorphic rocks around their school.

i) State three characteristics of metamorphic rocks that they would look for during the study. (3mks)
ii) State three activities that they would carry out during the study. (3mks)
iii) State three reasons why they might require a work schedule. (3mks)
iv) Why would it be necessary to collect samples of rocks during the study. (3mks)
v) State three problems they are likely to experience during the study. (3mks)

8 a) Differentiate between Orogenic and epeirogenic movements. (2mks)

b) The diagram below shows a fault. Use it to answer the following questions.
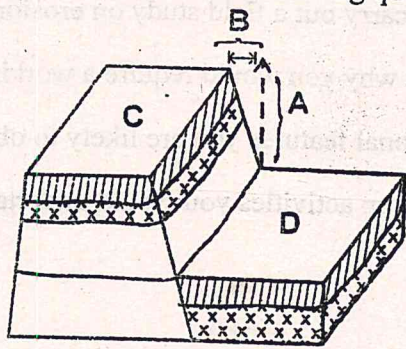
i) Identify the type of the fault. (1mk)
ii) Name the parts labelled. (3mks)
    A -
    B -
    C -

c) Apart from the Rift valley, name two features resulting from faulting. (2mks)

d) Explain three effects of faulting to physical environment. (6mks)

e) With the aid of a labelled diagram, describe the formation of an over thrust fold. (5mks)

f) Describe the formation of the Rift valley through tensional forces. Use illustrations. (6mks)

9. i) Define the term physical weathering. (2mks)

ii) Explain three ways in which physical weathering by temperature changes may occur. (6mks)

b) Explain three ways in which biological weathering occurs. (6mks)

c) Explain how the following factors affect chemical weathering.
   Steep slope. (2mks)
   High elevation (2mks)

d) The diagram below shows a type of mass wasting.
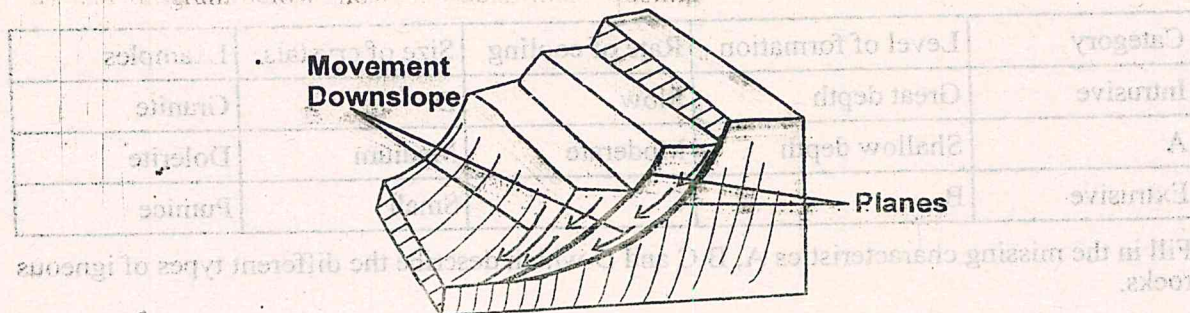
i) Name the type of mass wasting illustrated in the diagram. (1mk)

ii) Name two other types of landslides. (2mks)

iii) Explain two effects of landslides on drainage. (4mks)

10 a) i) Name two mountains in East Africa which are ice capped. (2mks)

ii) Identify three ways in which ice moves. (3mks)

b) Describe the formation of the following glacial features:
   i) Hanging valley (6mks)
   ii) Pyramidal peak (6mks)

c) You are required to carry out a field study on erosional features is glaciated lowland area.

i) Give two reasons why you would require a working schedule. (2mks)

ii) Name three erosional features you are likely to observe during the field study. (3mks)

iii) Give three follow-up activities you would undertake after the field study. (3mks)

Name ....

Candidate's Signature ....

Date ....

312 / 2
GEOGRAPHY
Paper 2
End of Term 1 2018

Time: 2 ¾ Hours
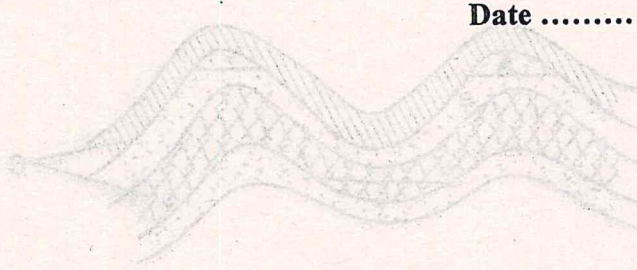
FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

312/2
Geography paper 2

INSTRUCTIONS TO CANDIDATES

- This paper consists of **two** section; **A** and **B**
- Answer **ALL** questions in section A
- In section **B** answer question **6** and any other **two** questions

This paper consists of 4 printed pages.
Candidates should check the question paper to ensure that all the
Printed pages are printed as indicated and no questions are missing

Answer all the questions in this section

1. Study the diagram below on formation of petroleum and answer the questions that follow.
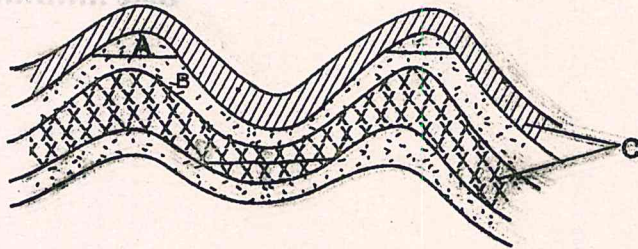
   a) What is represented by letters A, B and C. (3mks)

   A -

   B -

   C -

   b) State three conditions necessary for the formation of petroleum. (3mks)

2 a) State three physical conditions that favours sugarcane growing in the Lake Victoria basin of Kenya.
   (3 mks)

   b) State two problems experienced by sugarcane farmers in Kenya. (2 mks)

3. a) Name two districts in Rift valley of Kenya where beef farming is practised. (2mks)

   b) Compare Beef farming between Kenya and Argentina. (4mks)

4 a) Give two reasons why hardwood tree species in Kenya are in danger of extinction. (2mks)

   b) State two ways in which softwood forest in Kenya differ from those of Canada. (2mks)

5 a) Name two horticultural crops grown in Kenya. (2mks)

   b) State two reasons why horticulture is more developed in the Netherlands than in Kenya. (3mks)

SECTION B

Answer questions 6 (compulsory) and any other two questions from this section.

6. The table below shows four principles crops produced in Kenya in the years 2000 and 2001. Use it to answer question a and b.

CROP	AMOUNT IN METRIC TONS	
	2000	2001
Wheat	70,000	130,000
Maize	200,000	370,000
Coffee	98,000	55,000
Tea	240,000	295,000

Source central Bureau of statistics

a) i) Using a scale of 1cm represent 50,000 metric tons, draw a comparative bar graph based on the above data. (8mks)

ii) State two advantages of using comparative bar graphs in data presentation. (2mks)

b) Calculate the percentage increase in wheat production between the two years. (2mks)

c) State five physical conditions required for tea growing in Kenya. (5mks)

d) Explain four problems experienced in small scale tea growing in Kenya. (8mks)

7. a) i) What is forestry. (2mks)

ii) Explain three factors that favour the growth of natural forests on the slopes of Mt Kenya.(6mks)

iii) State five factors that have led to the reduction of area under forest cover on the slopes of Mt Kenya. (5 mks)

b) Explain four measures that the government of Kenya is taking to conserve forests in the country. (8mks)

c) Give the differences in the exploitation of softwood forest in Kenya and Canada under the following sub-headings.
   i) Period of harvesting (2mks)
   ii) Transportation. (2mks)

8. Use the map of Africa below to answer question (a)
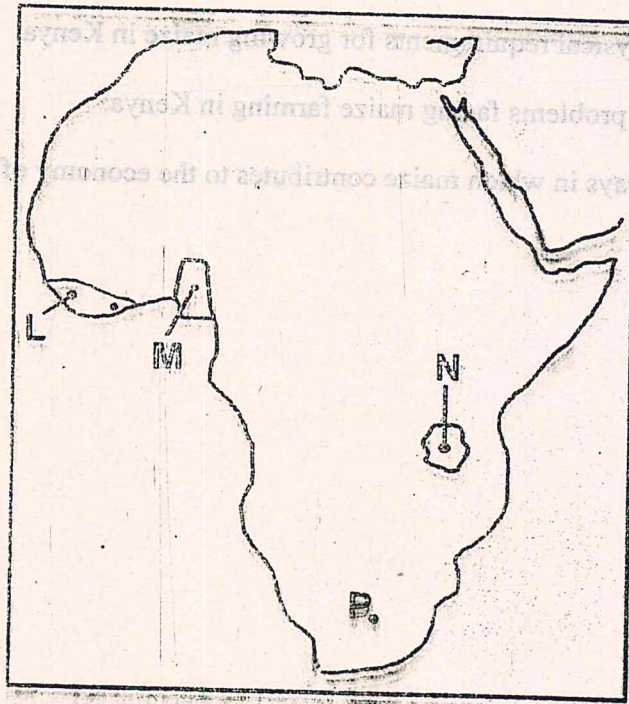
a) Name:
   i) The minerals mined in the shaded area marked L, M, N. (3mks)
   ii) The mining town marked P. (1mk)

b) i) A part from deep shaft mining, give three other underground mining methods. (3mks)

ii) Describe how shaft mining is carried out. (6mks)

c) Explain four ways in which mining contributes to the economy of Kenya. (8mks)

d) State four negative effects of mining on the environment. (4mks)

9 a) i) What is pastoral farming. (2mks)

ii) List three characteristics of pastoral farming. (3mks)

iii) Identify four factors which make zero grazing a preferred method of dairying compared to pasture grazing. (4mks)

b) i) State four problems facing dairy farming in Kenya. (4mks)

ii) Identify four factors that favour dairy farming in Denmark. (4mks)

c) Explain four measures taken by the Kenyan government to improve dairy farming in the country. (8mks)

10 a) i) State three characteristics of intensive farming. (3mks)

ii) Outline 4 factors that have led Kenya to change from subsistence farming to commercial farming. (4mks)

b) i) Name three districts in Kenya where maize in grown on a large scale. (3mks)

ii) State four physical requirements for growing maize in Kenya. (4mks)

iii) Explain four problems facing maize farming in Kenya. (8mks)

iv) State three ways in which maize contributes to the economy of Kenya. (3mks)
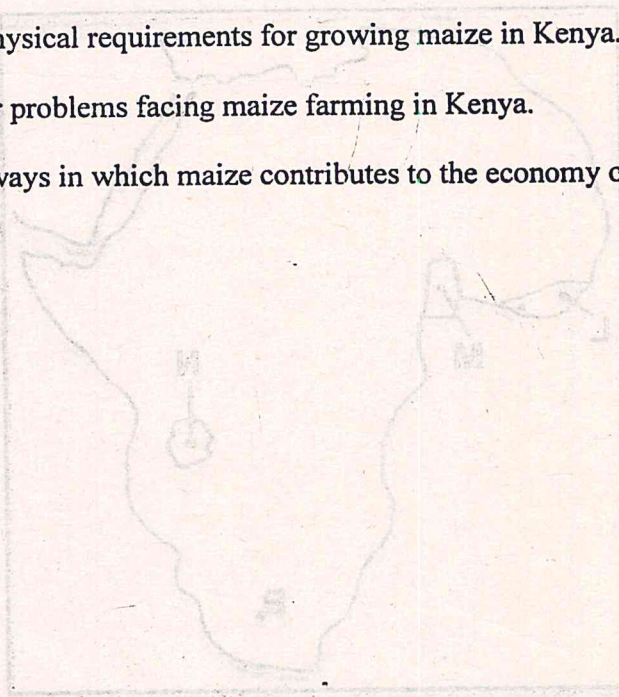
c) Name the products Z in
i) Plants   (1 mark)

....

ii) Animals   (1 mark)

....

d) What would be the fate of pyruvic acid if oxygen supply is availed in the mitochondria of an animal cell.   (2 marks)

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e) What is meant by the term oxygen debt ?   (1 mark)

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5. a) Distinguish between natural and acquired immunity.   (1 mark)

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b) Define the term allergy.   (1 mark)

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c) The chart below shows the blood clotting mechanism.
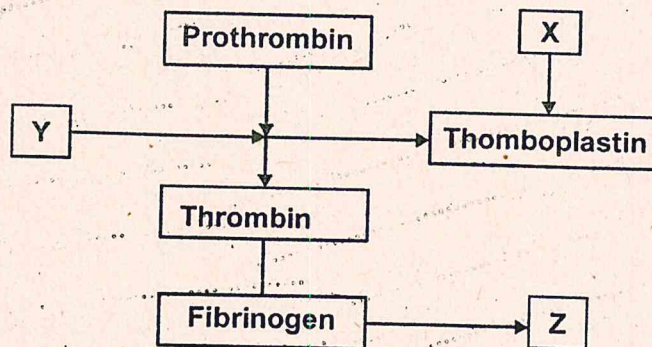
i) Name the blood cells represented by X.   (1 mark)

....

ii) The end product of the mechanism represented by Z.   (1 mark)

....

d) Explain how the following environmental factors increase the rate of transpiration.

i) Temperature   (2 marks)

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ii) Humidity   (1 mark)

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iii) Atmospheric pressure   (1 mark)

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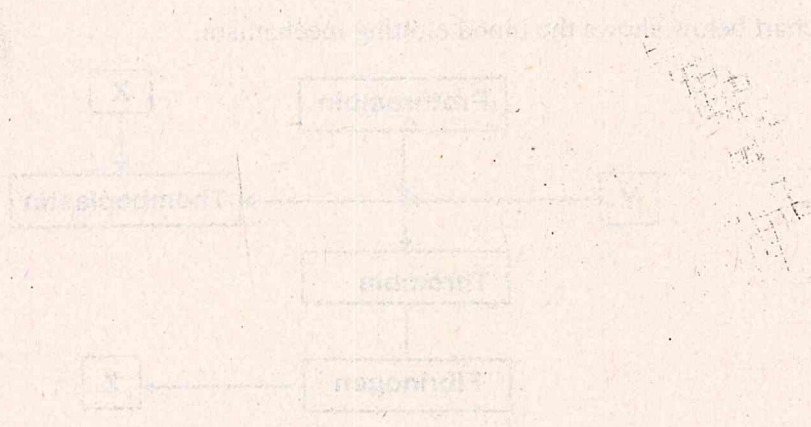
SECTION B : (40 MARKS)
Answer question 6 (compulsory) in the spaces provided and either
question 7 or 8 in the spaces provided after question 8.

6. In an experiment 900 viable seeds of a certain species were divided into groups of 100 seeds each. Each group of seeds were placed at different temperatures but same conditions of air and moisture. The percentage germination was determined after 10 days. The table below shows percentage germination at various temperatures.

Temperature °C	0	5	10	15	20	25	30	35	40	45
% germination	0	0	2	5	16	50	84	30	2	0

a) Using a suitable scale, draw a graph of percentage germination against temperature on grid provided. (6 marks)
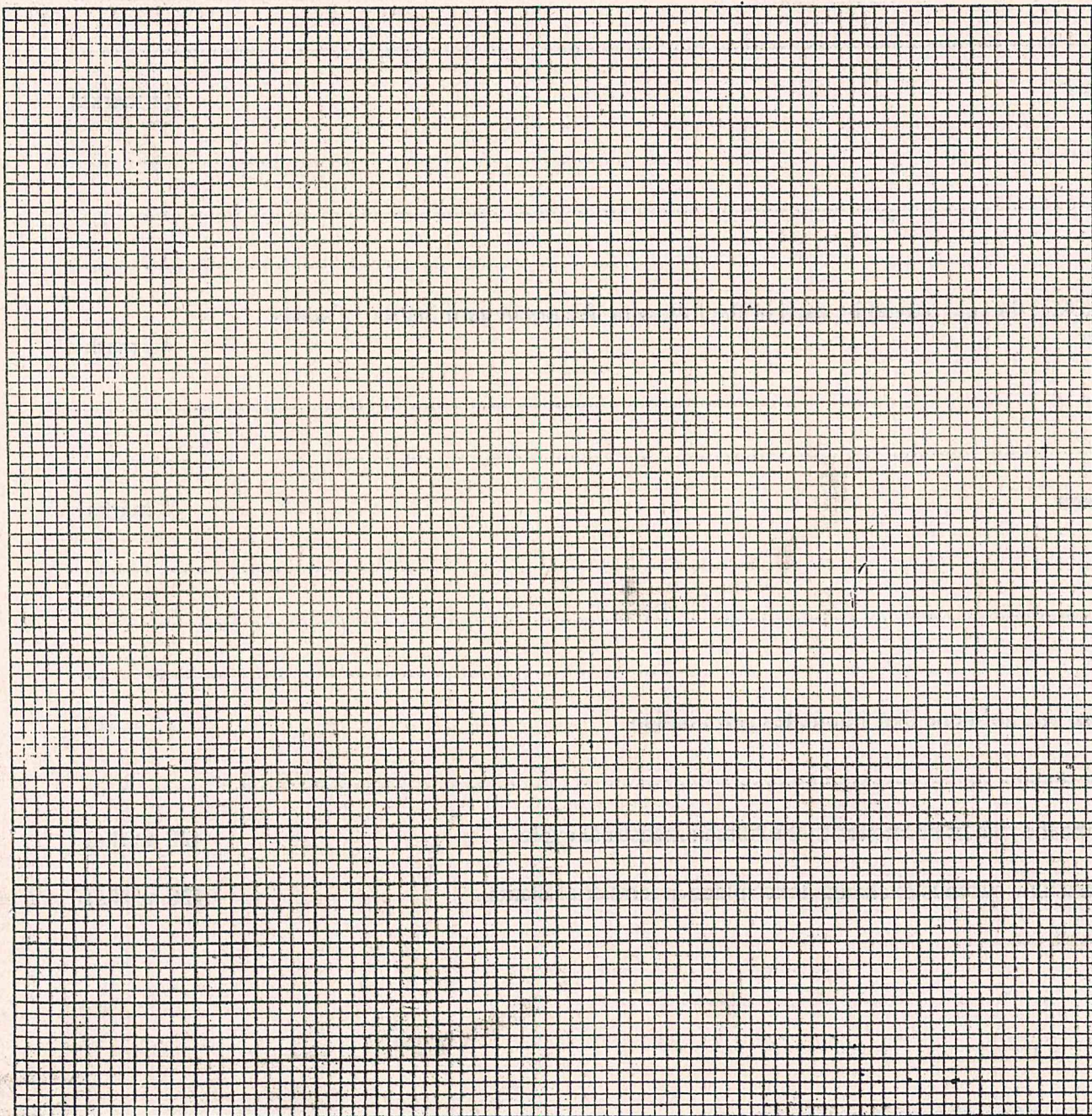
b) Account for germination at :

i) 5°C
(3 marks)

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ii) 30°C
(3 marks)

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iii) 45°C
(3 marks)

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c) Explain the role played by each of the following factors in germination of seeds.
i) Air
(1 mark)

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ii) Water
(3 marks)

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d) State one hormone that stimulates germination.
(1 mark)

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7. Describe the role of hormones in the human menstrual cycle.
(20 marks)

8. Describe how gaseous exchange takes place in terrestrial plants.
(20 marks)

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Name ....

Candidate's Signature ....

Date ....

231 / 1
BIOLOGY
Paper 1
(THEORY)
End of Term 1 2018

Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

231/1
Biology paper 1

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided above.
- Sign and write the **date** of the examination in the spaces provided above.
- Answer **all** the questions in the spaces provided.
- Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

FOR EXAMINER'S USE

Question	Maximum Score	Candidate's Score
1-29	80	

This paper consists of 8 printed pages
Candidates should check to ascertain that all pages are printed as indicated.
And that no questions are missing.

1. Name two classes of phylum *Arthropoda* with *Cephalothorax*. (2 marks)

....

....

2. Give two characteristics that distinguish scientific names of organisms from the ordinary names. (2 marks)

....

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3. A student was viewing a slide preparation of onion cell under high power objective lens of a light microscope and observed that the features of the cell were blurred.
   a) Name the part of the microscope the student would use to obtain sharper focus of the features. (1 mark)

....

   b) State the function of mirror in a light microscope. (1 mark)

....

4. a) Guard cells are specialized epidermal cells. State two structural features which suit them to their functions. (2 marks)

....

....

   b) Apart from gaseous exchange, give one other function of stomata. (1 mark)

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5. State the importance of blood capillaries of the skin vasoconstricting when body temperature is below normal. (2 marks)

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6. State three characteristics that make alveolus and buccal cavity suitable for gaseous exchange. (3 marks)

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7. State the role of light in photosynthesis. (2 marks)

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8. The diagrams below shows a red blood cell that was subjected to a certain treatment.
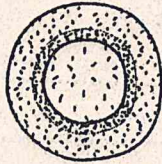
At start   **At the end of experiment**

a) Account for shape of the cell at the end of the experiment.   (2 marks)

....

....

b) Draw a diagram to illustrate how a plant cell would appear if subjected to the same treatment.
                                                                                    (1 mark)

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9. The diagram below shows a stage in mitosis in a plant cell.

a) Name the stage of mitosis.   (1 mark)

....

b) Give two reasons for your answer in (a) above.   (2 marks)

....

....

c) Name the part of the plant from which the cell used in preparation was obtained. (1 mark)

....

10. a) What is seed dormancy ?   (1 mark)

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....

b) Account for the following phases of a sigmoid curve of growth of an organism.
i) Lag phase
                                                                                    (1 mark)

....

ii) Plateau phase
                                                                                    (1 mark)

....

11. a) Name the causative agents of the following diseases in humans. (2 marks)

i) Typhoid ....

ii) Amoebic dysentery ....

b) Name the disease in humans caused by *plasmodium falciparum*. (1 mark)

....

12. a) In what form is energy stored in muscles. (1 mark)

....

b) State the economic important of anaerobic respiration in plants. (2 marks)

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13. Give the functions of the following parts of the heart.
i) Pericardium (1 mark)

....

ii) Coronary vein (1 mark)

....

14. i) Name the two main antigens that determine human blood groups. (2 marks)

....

....

ii) State the symptoms of haemolytic disease of the newborn. (1 mark)

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15. Form 3 students from Bidii school were estimating population of grasshoppers in their school field. They caught, marked and released 300 grasshoppers. The following day they captured 278 grasshoppers out of which 80 had been marked.
a) Calculate the population of the grasshopper. (2 marks)

....

....

....

....

b) State one assumption that was made during the investigation. (1 mark)

....

16. Below are some parts of a male reproductive system, state how they are adapted to their functions.

(4 marks)

i) Testis

....

ii) Vas deferens

....

iii) Epididymis

....

iv) Sertoli cells

....

17. a) Distinguish between pyramid of numbers and pyramid of biomass. (2 marks)

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b) Give a reason why pyramid of biomass is a better representation of an ecological relationship.

(1 mark)

....

....

18. How is the aerenchyma tissue adapted to its functions ? (2 marks)

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19. Though transpiration can cause death of a plant under certain environmental conditions, it is nonetheless very important to the life of a plant.

a) State three important roles of transpiration. (3 marks)

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....

....

b) What circumstances would transpiration lead to death of a plant ? (1 mark)

....

....

20. The equation below represents a metabolic process that occurs in a mammalian liver.

$$Amino\ acids \xrightarrow{Enzyme} Organic\ compounds + Urea$$
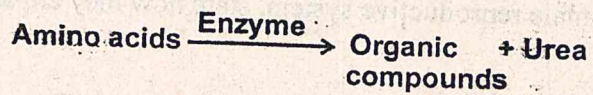
a) Name the process represented by the equation above.

(1 mark)

....

b) What is the importance of the above process in mammals ?

(2 marks)

....

....

c) What is the source of amino acids in this process ?

(1 mark)

....

21. a) Distinguish between respiration and gaseous exchange.

(2 marks)

....

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b) The oxidation of a certain fat is represented by the chemical equation shown below.

$$C_{57}H_{104}O_6 + 81O_2 \longrightarrow 57CO_2 + 5H_2O + energy$$

i) Calculate the respiratory quotient (RQ) of the fat molecule above.

(2 marks)

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22. The diagram below shows dentition of a dog.
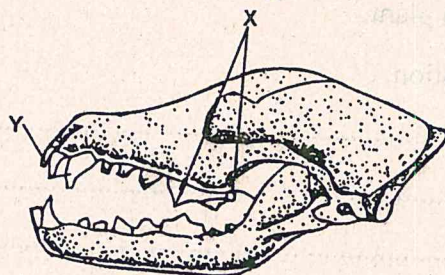
a) i) Name the part labelled X

(1 mark)

....

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

(1 mark)

....

b) State how part labelled Y is adapted to its function. (1 mark)

....

....

23. State the branch of biology that deals with the study of :
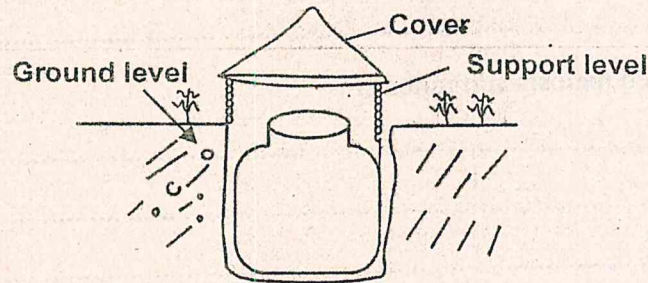   i) Chemical changes in living organisms (1 mark)

....

    ii) The relationship between organisms and their environment (1 mark)

....

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

    i) What is the name given to the apparatus shown above. (1 mark)

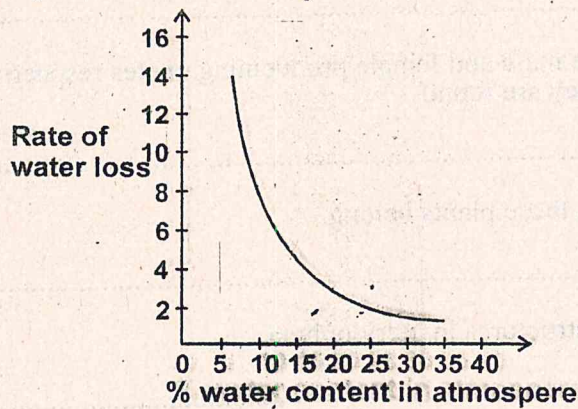..

    ii) What is its use in biological studies ? (1 mark)

....

25. The graph below shows the relationship between the percentage water content in the atmosphere and the rate of water loss by a certain terrestrial plant.

    a) Explain the relationship indicated by the above graph. (2 marks)

....

....

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....

b) Explain how dropping of leaves on a hot sunny day minimizes the rate of transpiration in higher plants

(1 mark)

....

....

26. State one importance of each of the following excretory products in plants.
    i) Quinine

(1 mark)

....

ii) Rubber

(1 mark)

....

iii) Papain

(1 mark)

....

27. a) Distinguish between meiosis and mitosis.

(2 marks)

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....

....

....

b) State one significance of meiosis in organisms.

(1 mark)

....

28. State the functions of ecdysone hormone.

(2 marks)

....

....

29. Antheridia and Archegonia are male and female producing gametes respectively.
    a) State the plants in which they are found.

(1 mark)

....

b) Name the division to which these plants belong.

(1 mark)

....

c) Name the spore producing structures in pteridophyta.

(1 mark)

....

....

NAME ....INDEX NO.....................................

CANDIDATE'S SIGN .... DATE ....

231 / 2
BIOLOGY
Paper 2
End of Term 1 2018
Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018
Kenya Certificate of Secondary Education
231/2
Biology paper 2

INSTRUCTIONS TO CANDIDATES
- Write your name and admission number in the spaces provided above.
- This paper consists of TWO sections; A and B.
- Answer all the questions in section A in the spaces provided.
- In section B answer questions 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

FOR EXAMINER'S USE ONLY

SECTION	Question	Maximum score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
		80	

Candidates should check the question paper to ascertain that all the pages are printed and that no question is missing.

SECTION A : (40 MARKS)

Answer all questions in this section in the spaces provided.

1. The diagram below represents a generalised cell structure as seen under an electron microscope.
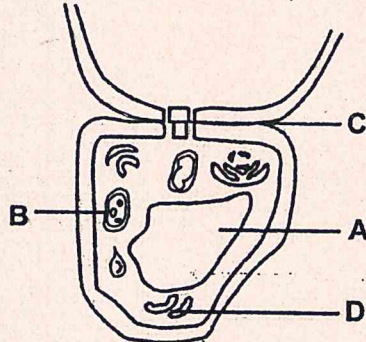
a) Name structures labelled A, B and C. **(3 marks)**

....

....

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b) How is structure labelled B adapted to its functions. **(2 marks)**

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c) What difference would be observed between electron micrograph obtained from a cheek cell of a frog and the one above. **(2 marks)**
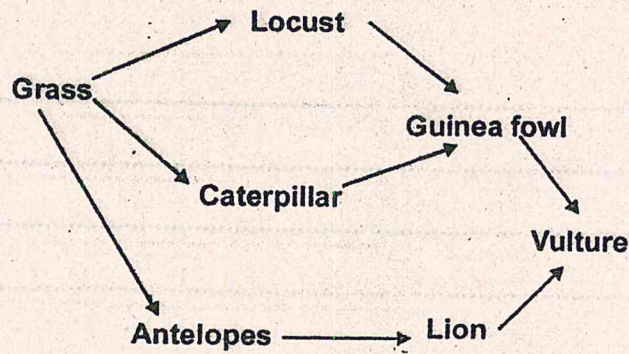
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d) Explain the function of structure labelled D. **(1 mark)**

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2. Study the food web below representing a certain ecosystem and use it to answer the questions that follow.

a) Distinguish between a food chain and a food web. (1 mark)

....

....

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b) With a reason, name the organisms that would have the largest biomass.

Organism .... (1 mark)

Reason (2 marks)

....

....

c) Write down a food chain in which vultures are tertiary consumers. (1 mark)

....

....

d) What would be the effect of introducing gazelles and termites into the ecosystem ? (1 mark)

....

e) State the trophic level occupied by the lion in the food web. (1 mark)

....

f) What would be the role of bacteria in this ecosystem ? (1 mark)

....

....

3. Explain how the following parts of the mammalian skin are involved in lowering the body temperature.
   i) Sweat glands   (2 marks)

   ....

   ....

   ....

   ....

   ii) Erector pilli muscle   (3 marks)

   ....

   ....

   ....

   ....

   iii) Blood vessels   (3 marks)

   ....

   ....

   ....

   ....

4. Study the flow chart below of a process that takes place in both plants and animals.

   $C_6H_{12}O_6$

   Enzyme controlled
   Chemical reaction X

   ↓

   Pyruvic Acid

   Enzyme controlled reactions
   in organelle Y of the cell
   in absence of oxygen

   ↓

   Products Z   In both plants and animals
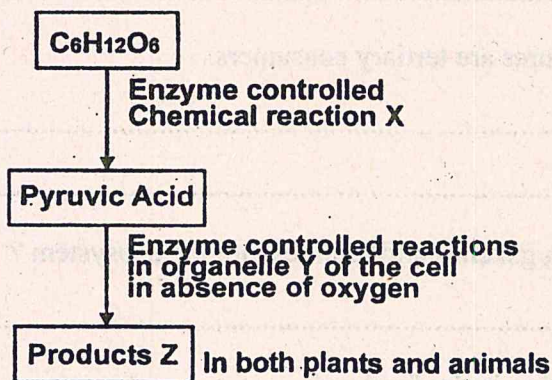
   a) Name the above process.   (1 mark)

   ....

   b) i) In the above process name the chemical reaction represented by X.   (1 mark)

   ....

   ii) Name the part of the cell where the enzyme controlled reactions in b(i) above takes place. (1 mark)

   ....

231 / 3
BIOLOGY
Paper 3
(Practical)
End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

231/3

Biology paper 3

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided
- Write the date of examination in the spaces provided above.
- Answer all the questions in the spaces provided.
- You are required to spend the first 15 minutes of the 1 ¾ hours allowed for the paper reading the whole paper carefully before commencing your work
- Additional papers must not be inserted
- Candidates may be penalized for recording irrelevant information and for incorrect spelling of technical terms.

EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1	12	
2	15	
3	13	
TOTAL	40	

1. The photographs below shows two different lifecycles of two animal species. Study them carefully and answer the questions that follow.
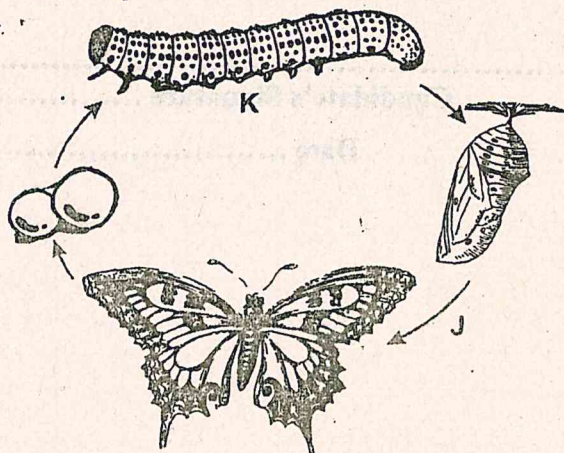
CYCLE A
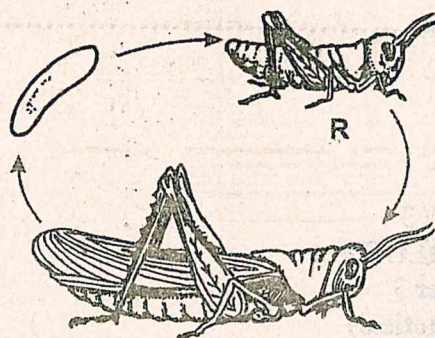
CYCLE B

a) Identify the type of development represented by each cycle. (2 marks)

A ....

B ....

b) i) Name the phylum to which the organisms belong. (1 mark)

....

Ii) Name the class to which the organisms belong and state two distinguishing features found in the members. (3 marks)

Class...

Reasons

....

....

....

c) State the significance of the stages labelled J and K. (4 marks)

J ....

....

K ....

....

d) Identify the differences in the characteristics of stage P and R shown in the photographs. (2 marks)

Stage P	Stage R
....	....
....	....
....	....
....	....

2. You are provided with the following apparatus and solution

- 2 visking tubing
- solution P
- solution Q
- 2 beakers
- distilled water
- Iodine solution
- Benedict's solution
- Threads

i) Test the beaker water and solution P in the beaker using Benedict's solution. Record your results in table below. (2 marks)

	Procedure	Observations
Solution P		
Beaker water		

Tie one end of the visking tubing and pour solution P into the visking tubing and tie the other end. Set up the apparatus as shown in the set up I below.
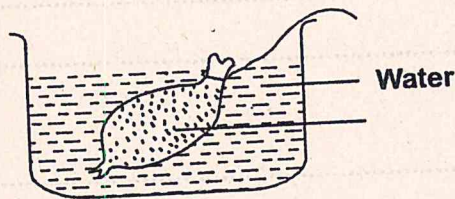
Water

ii) Allow set up to stand for 30 minutes then test the water in the beaker and solution P in the visking tubing with Benedict's solution and record your results in the table below. (2 marks)

	Observations
Solution P	
Beaker water	

b) i) Observe solution Q and iodine solution in the beaker. Record your observation in the table below. (2 marks)

	Observations
Solution Q	
Beaker Iodine	

TERM 1

Tie one end of the visking tubing and pour solution Q into the visking tubing and tie other end. Put the visking tubing with the contents in the iodine as shown in the set up II below.
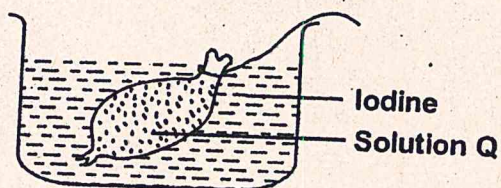
Iodine
Solution Q

ii) Observe the colours again after 30 minutes and record your observations in the table below.
(2 marks)

	Observations
Solution Q	
Beaker Iodine solution	

c) Identify the food substances present in :
i) Solution P
(1 mark)

....

....

ii) Solution Q
(1 mark)

....

....

d) State the function of the food substances in (c) above in the animal body.
(1 mark)

....

....

e) Explain the changes that took place in :
Set up I
(2 marks)

....

....

Set up II
(2 marks)

....

....

....

3. a) Photographs below represent specimens taken from two species of plants.

N1

N2
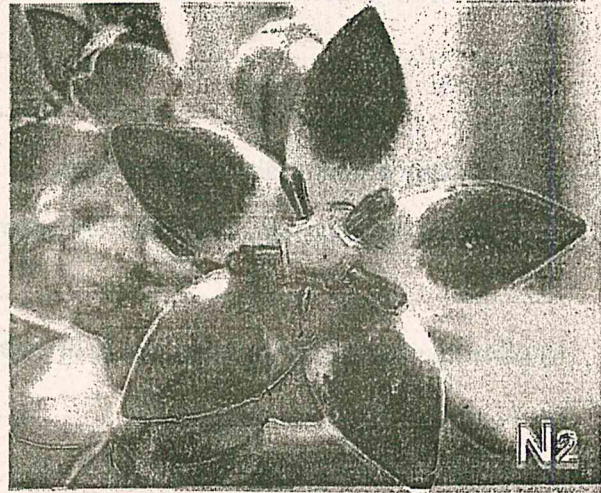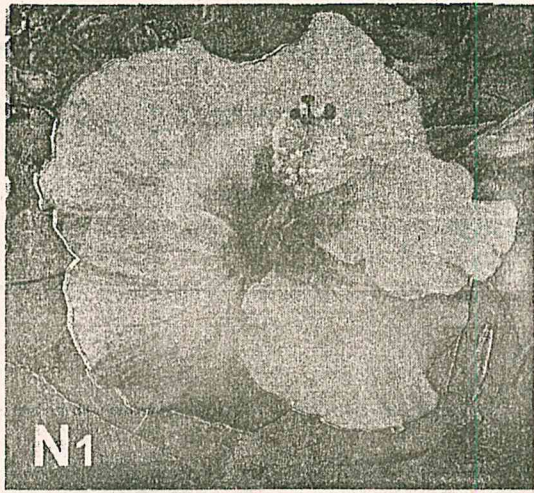
i) Describe the arrangement of the androecium in specimen N_1 (2 marks)

....

....

....

....

ii) Identify the sub-division to which the specimens belong.   (1 mark)

....

iii) Suggest the agent of pollination of the specimens.   (1 mark)

....

iv) Give reasons for your answer in a(iii) above.   (2 marks)

....

....

....
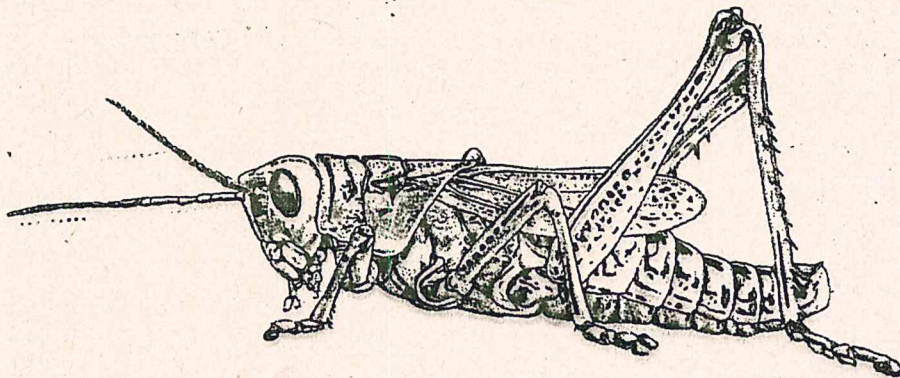
b) i) Name the phylum to which the animal belongs.   (1 mark)

....

ii) State two characteristics found in the members of the phylum named in b(i) above. (2 marks)

....

....

c) On the photograph label any two parts. (2 marks)

d) i) Name the class into which the organism belongs. (1 mark)

....

ii) Give one reason for your answer in d(i) above. (1 mark)

....
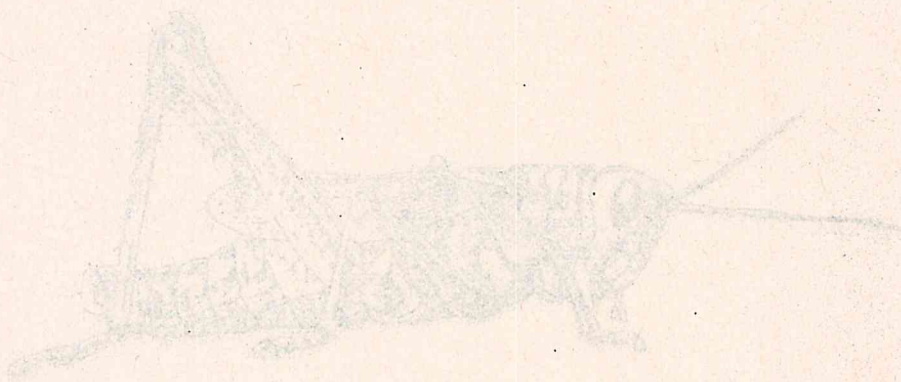
Name ....

Candidate's Signature ....

Date ....

233 / 1
CHEMISTRY
Paper 1
(THEORY)
End of Term 1 2018

Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education
233/1
Chemistry paper 1

INSTRUCTIONS TO CANDIDATES
- Write your name and admission number in the spaces provided.
- Sign and write the date of examination in the spaces provided.
- Answer all the questions in the spaces provided.
- Electronic calculators and mathematical tables may be used for calculations.
- KNEC mathematical tables and silent non-programmable electronic calculators may be used for calculations.
- All working **Must** be clearly shown.

FOR EXAMINER'S ONLY

QUESTIONS	MAX. SCORE	CANDIDATE'S SCORE
1 –24	80	

This paper consists of 8 printed pages

Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

1. a) Define isotopes. (1 mark)

    ....

    b) Determine the number of neutrons in $^{17}_{8}O$ (1 mark)

    ....

    ....

    ....

2. State two differences between luminous and non-luminous flame. (2 marks)

    ....

    ....

3. a) If sodium chloride is added to wax, its melting point is affected. Explain this effect. (1 mark)

    ....

    b) When alcohol is heated, it changes to gas at 78°C.

    i)   What is the name given to this temperature? (1 mark)

    ....

    ii) What will happen to this temperature if an impurity like salt is added to ethanol? (1 mark)

    ....

4. Starting with copper metal, describe how one can prepare a solid sample of copper (II) carbonate. (3 marks)

    ....

    ....

    ....

5. 12.5cm³ of 0.1M sodium hydroxide solution required 5.0cm³ of dilute sulphuric (VI) acid for complete neutralization. Calculate the molarity of the acid. (3 marks)

    ....

    ....

    ....

    ....

6. Elements M and N are in group II and III of the periodic table respectively. Both belong to period 2.

    a) Compare the ionic radii of the stable ions of the two elements. (2 marks)

    ....

    ....

    ....

b) Write equations to show the formation of the ions of M and N. (2 marks)

....

....

7. Metal S removed oxygen combined with P, Q reacts with an oxide of R, but not with an oxide of P. P reacts with cold water but Q does not.

a) Which is the most reactive metal? (1 mark)

....

b) Which is the least reactive metal? (1 mark)

....

c) Arrange the metals in order of reactivity starting with the most reactive to the least reactive. (2 marks)

....

....

....

8. When 94.5g of hydrated barium hydroxide, $Ba(OH)_2nH_2O$ were heated to constant mass, 51.3g of unhydrous barium hydroxide were obtained. Determine the empirical formula of hydrated barium hydroxide. (Ba = 137, O=16, H=1) (3 marks)

....

....

....

....

....

9. Explain why the boiling point of ethanol is higher than that of hexane. (Relative molecular mass of ethanol is 46 and that of hexane is 86) (2 marks)

....

....

10. a) Explain the observation made when excess chlorine gas is bubbled through, a colourless solution of potassium iodide. (3 marks)

....

....

....

b) Give the name to the type of reaction observed in (a) above. (1 mark)

....

11. A form three student heated copper (II) nitrate solid to a constant mass. Given a wooden splint and wet litmus paper, state the observation made and the products formed.

a) Observations made   (3 marks)

....

....

....

....

b) products formed.   (3 marks)

....

....

....

....

12. Using equations, explain why silicon chloride and phosphorus chloride fume in air.   (3 marks)

....

....

....

....

13. $100cm^3$ of oxygen gas diffuse through an opening in 10 seconds while as $150cm^3$ of an unknown gas X diffuse through the same opening in 12 seconds. Calculate the molecular mass of gas x (O=16)   (3 marks)

....

....

....

....

14. The diagram below shows the laboratory preparation of hydrochloric acid.
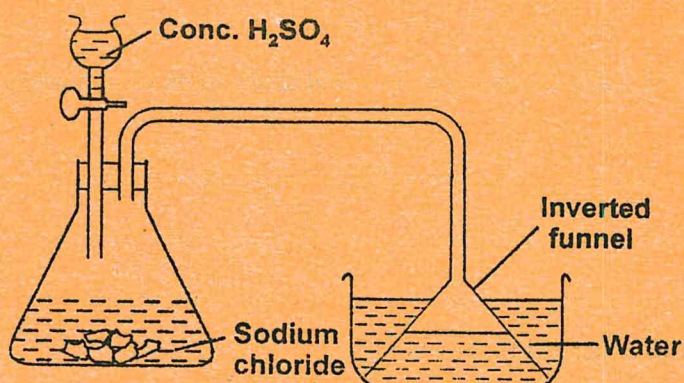
a) Write the equation for the reaction between sodium chloride and concentrated sulphuric acid.   (2 marks

....

....

b) Give two reasons why an inverted funnel is used instead of a delivery tube? (2 marks)

....

....

15.a) Why is it not advisable to use dilute nitric acid and zinc to prepare hydrogen gas. (2 marks)

....

....

b) State two important uses of hydrogen gas. (2 marks)

....

....

16. The set-up below can be used to study the reaction of magnesium and steam.
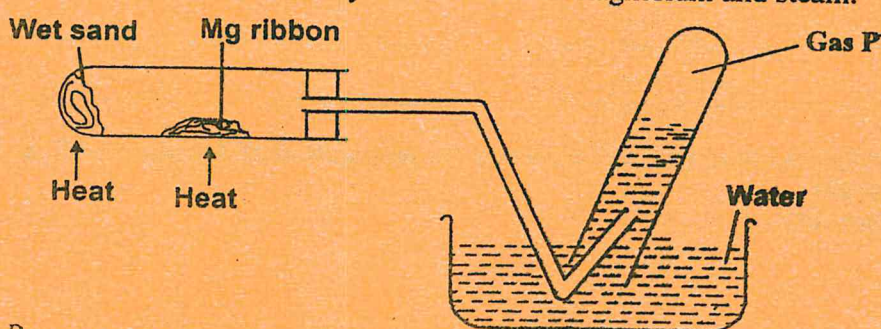
a) Name gas P. (1 mark)

....

b) How would you expect copper to behave compared to magnesium in the combustion tube.(2 marks)

....

....

c) Write the equation for the reaction between magnesium and steam. (2 marks)

....

....

17. List three observable changes made when hydrated copper (II) sulphate is heated in a boiling tube. (3 marks)

....

....

....

18. Give the systematic name of the following organic compounds. (2 marks)

i) $CH_2 = C-CH-CH_2$
       $|$
      CH_3

....

ii)
```
        CH3  CH3
         |    |
Ch3 – C – C – CH3
         |    |
        CH3  H
```

....
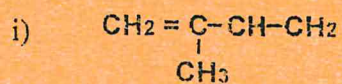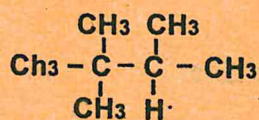
19. The molecular formula of a certain hydrocarbon is $C_{11}H_{24}$. The hydrocarbon can be converted to other hydrocarbons as shown below.

$$C_{11}H_{24} \xrightarrow{400-700°C} x + C_3H_6$$
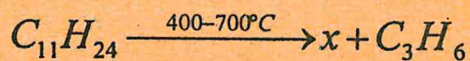
Draw and name the structural formulae of X.   (2 marks)

....

....

20. What is the difference between hydroscopic and deliquescent salts?   (2 marks)

....

....

21. The diagram below represents an incomplete set-up for preparation of dry sample of gas R.

Ammonium chloride and calcium hydroxide

Heat
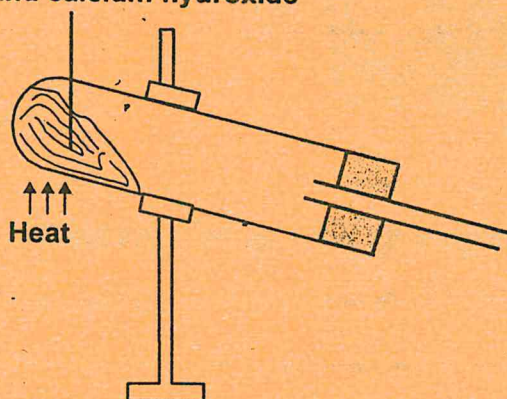
a)   Complete the diagram to show how a sample of gas R can be collected.   (2 marks)

b)   Write a chemical equation for the reaction that produces gas R.   (2 marks)

....

....

22. a) One of the uses of sulphur (IV) oxide is bleaching wood pulp in industries. Explain why paper that is bleached with sulphur (IV) oxide turns colour to yellow when exposed to sunlight.   (2 marks)

....

....

b) Name the products formed when sulphur (IV) oxide reacts with aqueous calcium hydroxide solution. (2 marks)

....

....

c) What is the significance of the reaction in (b) above in the manufacture of sulphuric (VI) acid. (2 marks)

....

....

23. In the last stage of solvay process, a mixture of sodium hydrogen carbonate and ammonium chloride is formed.

i) State the method of separation used. (1 mark)

....

ii) Write an equation to show how lime is slaked. (2 marks)

....

....

iii) Name the by-product recycled in the above process. (1 mark)

....

24. When potassium nitrate is heated, it produces potassium nitrite and gas C.

a) Identify gas C (1 mark)

....

b) Name the type of reaction undergone by the potassium nitrate. (1 mark)

....

c) Write the equation for the reaction in (b) above. (1 mark)

....

Name ....

Candidate's Signature ....

Date ....

233 / 2
CHEMISTRY
Paper 2 (THEORY)
End of Term 1 2018

Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018
Kenya Certificate of Secondary Education

233/2
Chemistry paper 2

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided.
- Sign and write the date of examination in the spaces provided.
- Answer ALL questions in the spaces provided.
- All working must be shown.
- Electronic calculators and mathematical tables may be used.

FOR EXAMINER'S ONLY

Questions	Maximum score	Candidates score
1	13	
2	11	
3	13	
4	9	
5	10	
6	14	
7	10	
TOTAL	80	

This paper consists of 8 pages. Candidates should check the question paper to ascertain that all Pages are printed as indicated and that no questions are missing.

1. The table below shows some elements of the periodic table and their atomic numbers, atomic masses and melting points. The letter are not the actual symbols of the elements.

Element	B	C	D	E	F	G	H	I	J	K
Atomic No.	7	8	19	15	2	9	6	16	12	11
Atomic mass	14	16	39	31	4	19	12	32	40	23
Melting point °C	-209	-218	63.7	44	-272	-223	vary	113	669	98

a) Select two elements with the valency of 3. (1 mark)

....

b) Which element is the most reactive metal ? Explain. (2 marks)

....

....

c) How does the atomic radii of D compare with that of K. Explain. (2 marks)

....

....

d) How do you compare the electrical conductivity of elements J and K. Give your reason. (1 mark)

....

e) Select two elements which when reacted with element G form a compound that conducts electricity both in molten and in aqueous state. (1 mark)

....

f) Explain why the melting point of H has not been given a specific value. (1 mark)

....

g) In which group period do D and G belong?

D Group .... G group ....(1 mark)

Period .... Period ....(1 mark)

h) Explain why the melting point of element K is higher than that of D. (1 mark)

....

i) Select one element stored in;

a) Water ....(1 mark)

b) Paraffin...(1 mark)

2. Study the scheme below and answer the questions that follow.
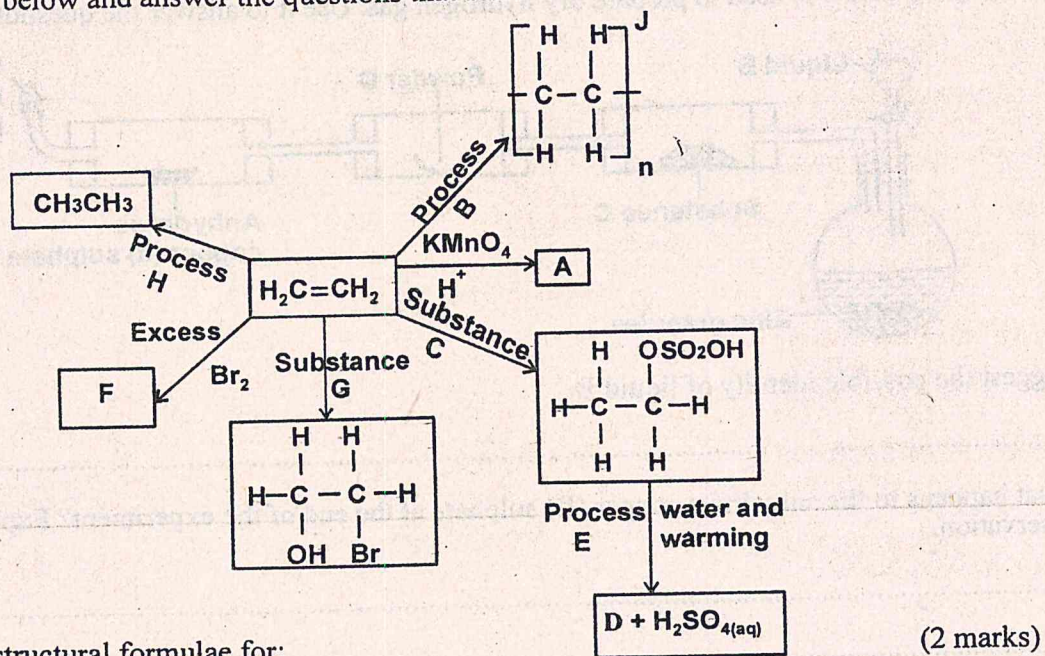
a) Draw and name structural formulae for:

   i) Substance A

....

....

   ii) Substance D

....

....

(2 marks)

b) Name

   i) Process B...

   ii) Process E...

c) Write an equation for the reaction involved in process H.

....

(1 mark)

d) Name the following substances :

(2 marks)

   i) Substance C ....

   ii) Substance G ....

e) State the conditions necessary for process H and B to take place.

(2 marks)

....

f) If compound J has a molecular mass of 282. Determine the number of monomers that is made of.

(2 marks)

....

....

3. The diagram below is used to prepare dry hydrogen gas. Use it to answer the questions that follows.
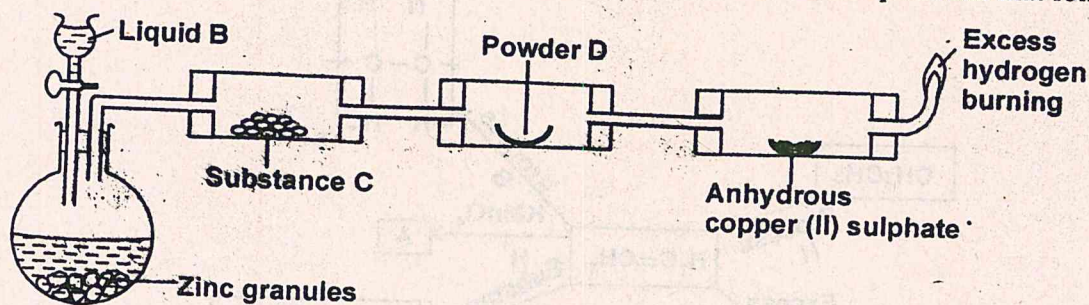
a) Suggest the possible identity of liquid B.
(1 mark)
....

b) What happens to the anhydrous copper (II) sulphate at the end of the experiment? Explain your observation.
(2 marks)
....
....

c) What is the name of the reaction between copper (II) oxide and hydrogen? Write the equation for this reaction.
(2 marks)
....
....

d) Name one solid substance which has a similar function to that of hydrogen in this experiment?
(1 mark)
....

e) What is the identity and function of C?
(1 mark)
....

f) In an experiment, the following figures were obtained.
Mass of porcelain boat   = 7.8g
Mass of boat + copper oxide   =9.8g
Mass of boat + substance remaining when cool=9.0g

i) What is the mass of copper oxide?
(1 mark)
....

ii) What is the mass of oxygen present in this mass of copper oxide.
(1 mark)
....

iii) What is the percentage by mass of copper in this sample of copper oxide?
(2 marks)
....
....

iv) Calculate the empirical formula of the oxide of copper (Cu=64.0, O=16.0)
(2 marks)
....
....

4. The flow chart below shows a sequence of reactions involving a mixture of two salts, mixture M. Study it and answer the questions that follow.

```
                        ┌──────────────┐
                        │  Mixture M   │
                        └──────────────┘
                    Step I │ .Add  water
                           ↓ .Filter
              ┌────────────┴─────────────────┐
              ↓                               ↓
        ┌──────────┐                   ┌──────────────┐
        │ Solid N  │                   │  Solution P  │
        └──────────┘                   └──────────────┘
    Step II │ Heat              Step VI │ .Acidified Ba(NO3)2(aq)
            ↓                           ↓ .Filtration
  ┌────────────────────────┐    ┌───────┴────────────┐
  │ Black solid Q and      │    ↓                    ↓
  │ a gas which forms      │ ┌──────────┐      ┌──────────┐
  │ a white precipitate    │ │Colorless │      │ White    │
  │ when bubbled through   │ │Solution  │      │ solid    │
  │ Ca(OH)2(aq)            │ └──────────┘      └──────────┘
  └────────────────────────┘   Add NH3(aq)
    Step III │ dil. H2SO4(aq)   in excess
             ↓               ┌──────────────────┐
     ┌────────────────┐      │ White pecipitate │
     │ Blue solutions │      │ disolves to form │
     └────────────────┘      │ a clear solution │
 Step IV │        │ Step V   └──────────────────┘
         ↓        ↓
  Excess NH3(aq)  Mg(s)
  ┌──────────┐  ┌──────────┐
  │deep blue │  │ Products │
  │solution L│  └──────────┘
  └──────────┘
```
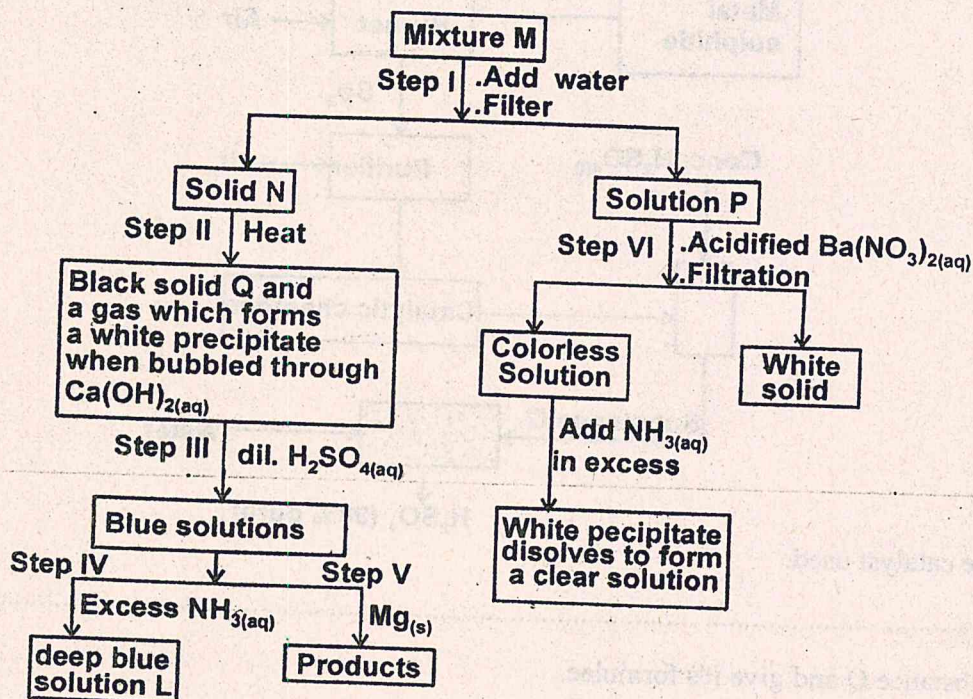
a) Write the formula of the following:

i) Anion in solid Q

(1 mark)

....

ii) The two salts present in mixture M.

(1 mark)

....

b) Write the ionic equation for the reaction in step VI.

(1 mark)

....

c) State and explain the observations made in step V.

(2 marks)

....

....

d) i) Starting with lead (II) oxide, describe how a pure solid sample of lead sulphate can be prepared in the laboratory.

(2 marks)

....

....

ii) How can one determine whether the lead sulphate prepared is pure?

(2 marks)

....

....

5. The flow chart below shows the contact process (manufacture of sulphuric (VI) acid).
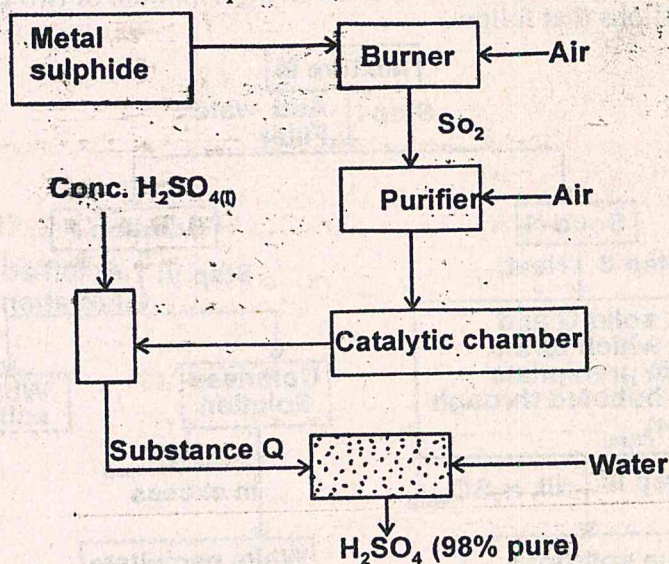
:) Name the catalyst used. (1 mark)

....

i) Name substance Q and give it's formulae. (1 mark)

....

c) Write the equation for formation of substance Q (1 mark)

....

d) What are the optimum conditions necessary for the contact process? (in terms of temperature and pressure) (2 marks)

....

e) How is pollution of atmosphere minimized in the contact process? (2 marks)

....
....

i) When concentrated sulphuric (VI) acid is exposed to air for some time, its volume tend to increase. Explain this observation. (2 marks)

....
....

ii)

iii) Write the formula for sulphuric (VI) acid and sulphuric (IV) acid. (1 mark)

....
....

6. Study the diagram below and answer the questions that follow.
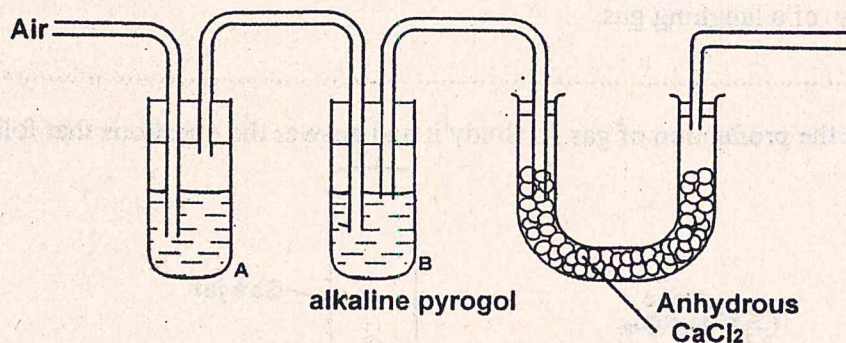
a) i) The solution in reagent bottle **A** is used to absorb CO_2 gas, name the solution and write the equation for the reaction of CO_2 and the solution.   (2 marks)

....

....

    ii) Name one impurity of nitrogen collected through this method.   (1 mark)

....

b) Ammonia undergoes catalytic oxidation forming an oxide which is further oxidised to form Nitric (V) acid as shown below.

$$4NH_{3(g)} + 5O_{2(g)} \rightarrow 4NO_{(g)} + 6H_2O_{(l)}$$

$$4NO_{(g)} + 2H_2O_{(l)} + 3O_{2(g)} \rightarrow 4HNO_{3(aq)}$$
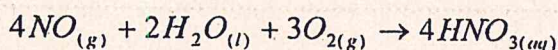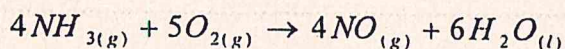
    i) If $3200cm^3$ of NH_3 were oxidised, calculate the mass of nitric (V) acid produced. (MGV=$24dm^3$, N=14, H=1, O=16)   (2 marks)

....

....

    ii) Urea $[Co(NH_2)_2]$ and NH_4NO_3 are nitrogenous fertilizers. Which is the most recommended fertilizer? Show your working (C = 12, O=16, N=14, H=1)   (2 marks)

....

....

c) Magnesium reacts in air forming two substances.

    i) Name the two substances.   (2 marks)

....

....

    ii) When litmus paper is added a solution of one of the product c(i) above, the litmus paper turns blue. Using a chemical equation, explain the observation.   (2 marks)

....

....

    iii) What is "laughing gas".   (1 mark)

....

iv) Explain the chemistry of a laughing gas. (1 mark)

....

7. The set-up below shows the production of gas X. Study it and answer the questions that follow.
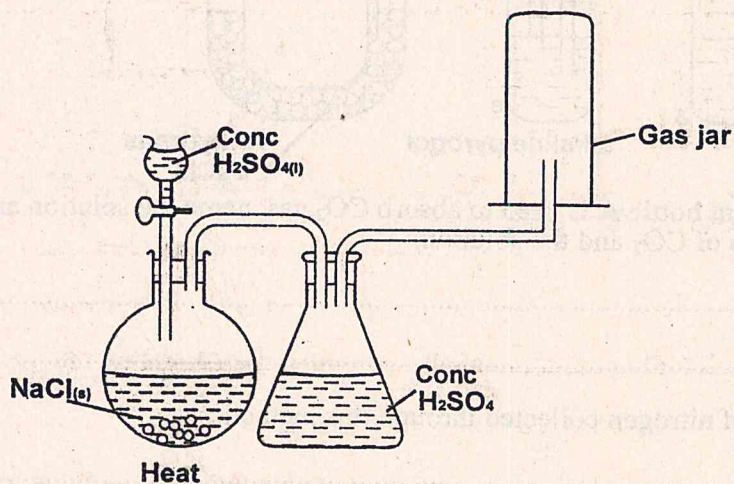
a) Identify two mistakes in the set-up above and suggest how they can be rectified. (2 marks)

....

....

b) Name gas x. (1 mark)

....

c) Write a balance equation for the production of gas X (1 mark)

....

d) A moist litmus paper was put in gas jar full of gas X. What was the observation made. (2 marks)

....

....

....

e) Ammonia gas was brought into contact with gas X:

i) What was observed? (1 mark)

....

ii) Write the equation for the reaction. (1 mark)

....

f) State the role of concentrated sulphuric (VI) acid in the conical flask. (1 mark)

....

g) A teacher told students not to prepare gas X on the laboratory bench. Suggest a reason for this.
(1 mark)

....

Name ....

Candidate's Signature ....

Date ....

233 / 3
CHEMISTRY
Paper 3
(Practical)
End of Term 1 2018

Time: 2 ¼ Hours

FORM FOUR PRE-EXAMINATION 2018
Kenya Certificate of Secondary Education

233/3
Chemistry paper 3

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **Index** number in the spaces provided above
- **Sign** and **write** the date of examination in the spaces provided above
- Answer all questions in the spaces provided.
- You are NOT allowed to start working with the apparatus for the first 15 minutes of the $2^1/_4$hours allowed for this paper. This time is to enable you read the question paper and make sure you have all the chemicals and apparatus you may need.
- Mathematical tables and electronic calculators may be used
- All working must be clearly shown where necessary

FOR EXAMINER'S USE ONLY

Question	Maximum Score	Candidate's Score
1	23	
2A	11	
2B	06	
Total score	**40**	

This paper of 5 printed pages

Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

1. You are provided with three solution K1, K2 and K3.
   - KI is a solution of sodium hydroxide containing 1.05g of solute in 250cm³ of solution.
   - K2 is a solution of a monobasic acid HX
   - K3 is a solution of an anhydrous metal carbonate, M_2CO_3 (RFM = 106), containing 5.3g of the carbonate dissolved in 500cm³ of solution.

   You are required to
   - Standardize the monobasic acid.
   - Determine the equation for the reaction between the acid HX and the carbonate M_2CO_3

PROCEDURE 1
Using a pipette transfer 25cm³ of solution, K1, into a clean conical flask. Titrate it with K2 (from the burette) using methyl orange indicator. Repeat the procedure recording your results in the table below.

TABLE 1	I	II	III
Final burette reading (cm³)			
Initial burette reading (cm³)			
Volume of K2 used (cm³)			

(4 marks)

i) (Calculate the average volume of the acid used. (1 mark)

....

ii) Calculate the concentration of K1 in moles per litre. (2 marks)

....

....

iii) Determine the concentration of K2 in moles per litres. (3 marks)

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PROCEDURE II.

Using a pipette, transfer 25cm³ of the metal carbonate solution, K3 into a clean conical flask. Titrate it with K2 (from the burette) using methyl orange indicator. Repeat the procedure recording your results in the table below.

Table II	I	II	III	(4 marks)
Final burette reading (cm³)				
Initial burette reading (cm³)				
Volume of acid used (cm³)				

i) Calculate the average volume of acid used. (1 mark)

....

....

ii) Calculate the concentration of K3 in moles per litre.   (2 marks)

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iii)Determine the number of moles of K3 present in the volume of K3 reacting.   (2 marks)

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iv)Determine the number of moles of K2 present in the volume K2 reacting.   (2 marks)

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v) How many moles of K2 reacted with 1 mole of K3.   (1 mark)

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....

vi)Write an equation for the reaction between K2 and K3.   (1 mark)

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2.A You are provided with solid D. Carry out the following tests and record your observations and inferences in the spaces provided.

i)   Place the solid D in a boiling tube and add about 10cm³ of distilled water while shaking the mixture. Filter the mixture and wash the residue. Divide the filtrate into four portions and then keep the residue for part B.

Observations	Inferences
(1 mark)	(1 mark)

ii) To the first portion, add sodium hydroxide until in excess.

Observations	Inferences
(1 mark)	(1 mark)

iii) To the second portion, add aqueous ammonia drop wise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

iv) To third portion, add a few drops of lead (II) nitrate solution.

Observations	Inferences
(1 mark)	(2 marks)

v) The fourth portion, add a few drops of acidified barium chloride solution.

Observations	Inferences
(1 mark)	(1 mark)

B. Place the residue in boiling tube and add dilute nitric (V) acid, little by little until all the solid dissolves. Divide the solution into two portions.

i)

Observations	Inferences
(1 mark)	(1 mark)

ii) To the 1st portion, add sodium hydroxide dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

iii) To the 2nd portion, add aqueous ammonia drop wise till in excess

Observations	Inferences
(1 mark)	(1 mark)

Name ....

Candidate's Signature ....

Date ....

232 / 1
PHYSICS
Paper 1
End of Term 1 2018

Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

232/1
Physics paper 1

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above
- This paper consists of TWO sections; Section A and B
- Answer ALL the questions in both sections in the spaces provided
- All working and answers MUST be written on the question paper in the spaces provided below each question.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY

	Questions	Maximum Score	Candidate's Score
Section A	1 – 14	25	
Section B	15	12	
	16	11	
	17	11	
	18	13	
	19	08	
Total		80	

SECTION A (25 MARKS)

1. Explain why a few drops of oil soon spread into circular patch when they fall on a clean water surface. (2 marks)

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2. Water flows in a pipe of a varying cross section as shown in the figure 1 below. Holes A and B develop with time.
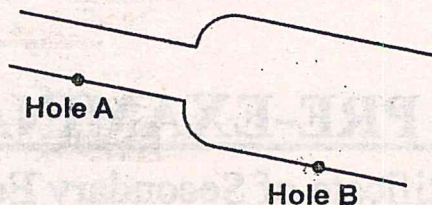
If the holes have the same dimensions, suggest with reason which hole leaks more. (2 marks)

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3. A window cleaner accidentally dropped an apple as he was cleaning a window of a tower 220 metres above the ground.
   a) If the air resistance is neglected how long will the apple take to reach the ground?
   Take $g = 10m/s^2$ (2 marks)

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   b) Assuming that he can shout loud enough, will it be of any use if the window cleaner shout to warm the people? (Speed of the sound in air = 340m/sec) (1 mark)

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4. Without taking any measurement, how could you show that 1g of ice has a greater volume than 1g of water. (1 mark)

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5. When a liquid is cooled in a glass flask, its level first rises then falls, explain this observation.

(2 marks)

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6. The figure 2 below shows two identical burning splinters placed on a wood and metal blocks respectively, state with reasons which of the splinters will be extinguished soon. (2 marks)

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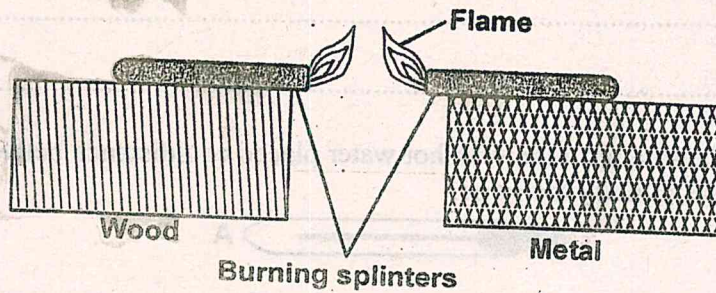
7. A stone is thrown vertically upwards from the edge of a flat platform. Eventually the stone lands without bouncing on the ground below the platform. Sketch a displacement time graph of the motion of the stone.

(2 marks)
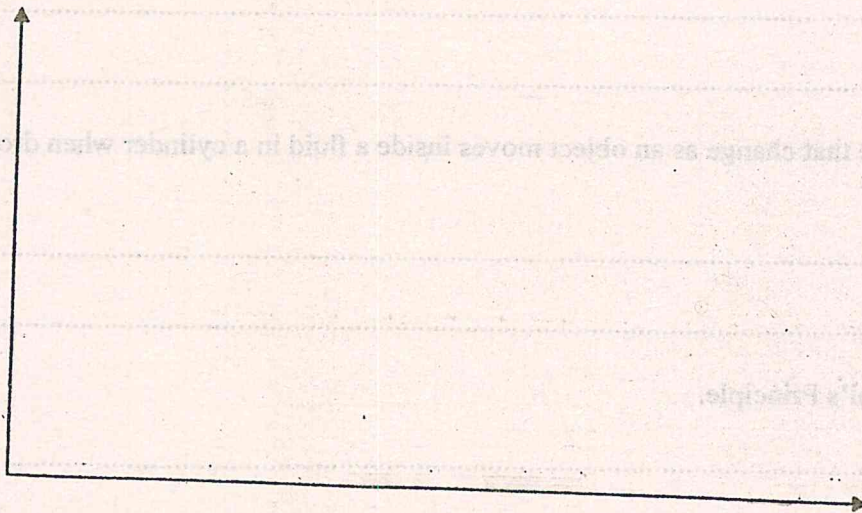
8. Water is known to boil at 100°C. A student heated some water and noticed that it boiled at 105°C. State two possible reasons for the observations.

(2 marks)

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9. Explain why when a car travels with increasing speed it feels lighter to the driver. (1 mark)

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10. State two factors that affect the constant of a spiral spring made using a wire of a certain material and of a given thickness. (2 marks)

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11. The figure 3 below shows a test tube with hot water placed equidistance between two thermometer A and B. The reading are initially the same.
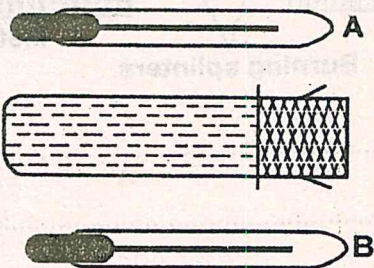
State with a reason, the thermometers that recorded higher reading 10 minutes later. (2 marks)

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12. State one force that change as an object moves inside a fluid in a cylinder when dropped downwards. (1 mark)

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13. State the Pascal's Principle. (1 mark)

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14. The diagram 4 below shows an empty wine glass.

State and explain the effects on stability when wine is put into the glass.   **(2 marks)**

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SECTION B (55 MARKS)

15. a) The figure 5 below shows a copper block of mass 1.8kg with the holes at the top. An 80W heater is placed in one hole and a thermometer in the other.
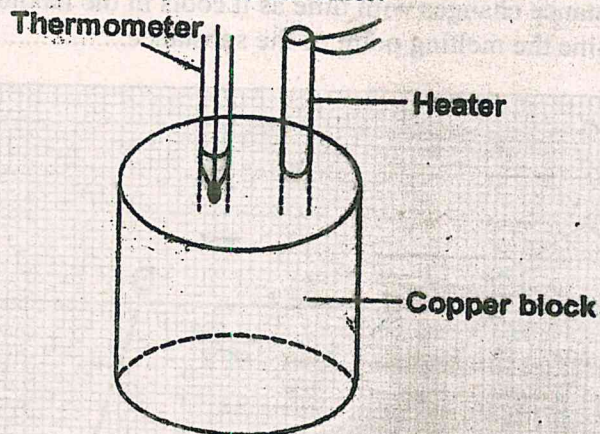
The heater is witched on for 5.0 minutes. Assume that no heat energy is lost from the block.

i) Calculate the energy supplied to the block.   **(2 marks)**

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ii) The specified heat capacity of copper is 390J(kg°C) Calculate the rise in temperature of the block.   **(3 marks)**

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b) The figure 6 shows a shallow dish containing a volatile liquid. The bulb of a thermometer is dipped in the liquid. A jet of air is blown over the surface of the liquid, so that the liquid evaporate rapidly.
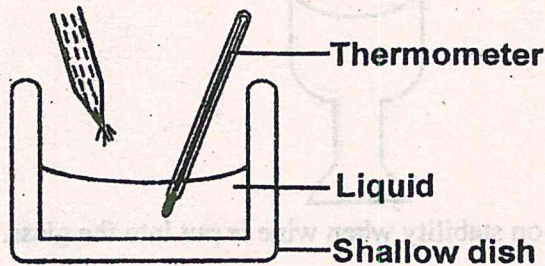
State and explain what happens to the reading shown on the thermometer.   (2 marks)

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c) A beaker contain 60g of hot substance, initially in the liquid state. The figure shows how the temperature of the substance changes with time as it cools in the laboratory.
i) Use the graph to determine the melting point of the substance.............................   (1 mark)
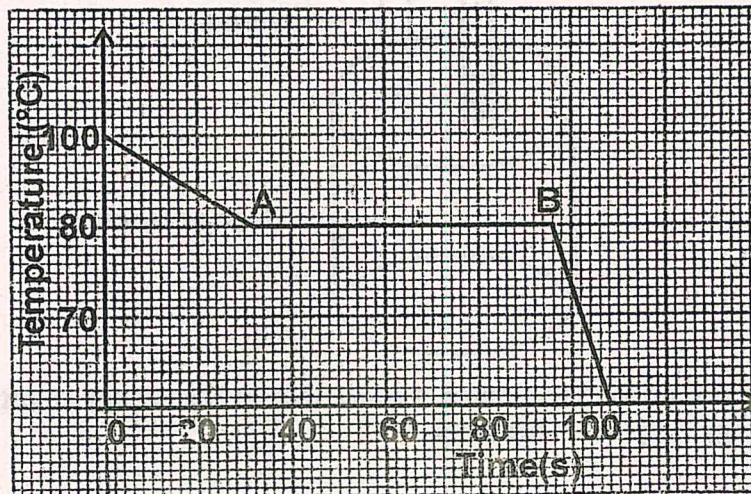
c) ii) Given specific heat capacity of the liquid is 1.75J/g°C. Calculate the loss of thermal energy (heat) from the liquid between t=0 and t = 20 seconds.   (2 marks)

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iii) Between point A and B, the temperature is constant as the substance charged from liquid to solid. Explain why the temperature stays constant even though thermal energy is lost by the substance.

(2 marks)

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16. a) State the principle of moments. (2 marks)

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b) A uniform metal strip is 3.0cm wide, 0.6cm thick and 100cm long. The density of the metal is 2.7g/cm^3.

The strip is placed on a pivot and kept in the equilibrium by the force as shown in the figure 7.
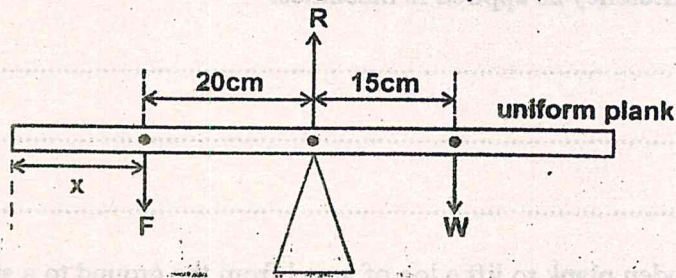
i) Determine the weight of strip. (2 marks)

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ii) Determine the values of F and R.
  I) F = (3 marks)

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....

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ii) R (2 marks)

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b) iii) X is the distance from the end of the plank to the point of application of force F. Force F is now applied at various point nearer to the pivot so that X increases. Equilibrium is maintained all the time. On the axis provided sketch the relation between force F and X. (1 mark)

F(N)↑

                              X(cm)
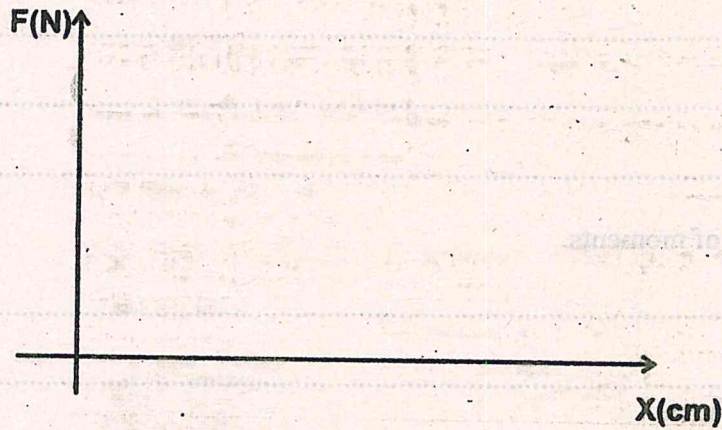
iv) Give a reason for the answer in (iii) above. (1 mark)

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17. a) Define the term efficiency as applied in machines. (1 mark)

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b) A man used a wooden plank to lift a log of wood from the ground to a stationary lorry on a flat ground as shown in the figure 8 below. The wooden plank was inclined at an angle of 30° to the ground.
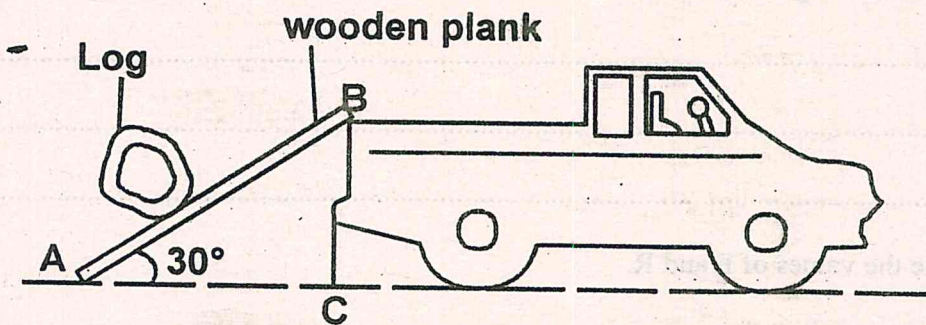
i) Show that the velocity ratio of the system is given as v.r = $^1/_{\sin 30°}$ (3 marks)

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ii) Calculate the mechanical advantage of the set up if its efficiently is 65%. (2 marks)

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iii) Explain why the efficiency of the system cannot be 100%. (1 mark)

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c) The figure 9 below shows a pulley system.
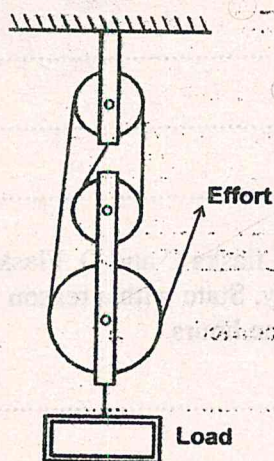
i) State the velocity ratio of the machine. (1 mark)

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ii) Explain what happens to the mechanical advantage of the machine as the load is increased gradually. (1 mark)

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d) Water falls from a water fall to the bottom. The temperature is found to be higher at the bottom than at the top.
i) State the energy transformation. (1 mark)

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18. The figure 10 below shows a cross-section of the vacuum flask.
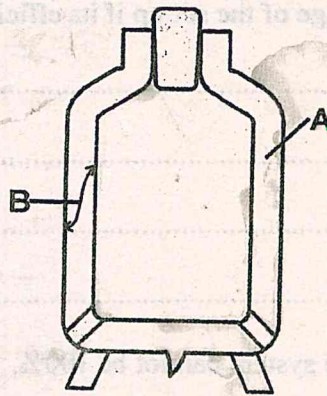
i) Name the parts labelled A and B. (2 marks)

A .... B ....

ii) Explain how the heat losses are minimised when hot liquid is poured into the flask. (3 marks)

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iii) Boiling water is poured into two identical flasks C and D. Flask C is partially filled while flask D is completely filled. Both are closed tightly. State with a reason the flask in which the water is likely to have higher temperature after some hours. (2 marks)

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b) In an experiment conducted in a laboratory 200g of clean ice is supplied with constant heat from a Bunsen burner and the temperature changes and the time in minutes recorded. The graph of temperature against time in minutes was plotted as shown in the figure 11 below.
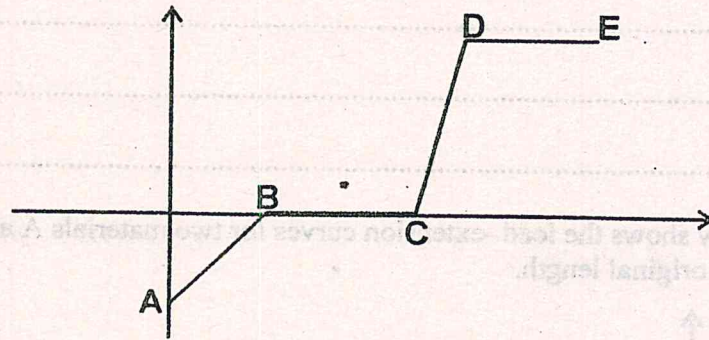
At point E all the water had vaporized.
i) Describe the observation at the section.

AB .... (1 mark)

....

BC .... (1 mark)

....

CD .... (1 mark)

....

ii) State with a reason why section DE is larger than BC.   (2 marks)

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19. a) State Newton's second law of motion.   (1 mark)

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b) A girl of mass 40kg stands on a scale balance in a lift. The lift is accelerating upwards. At one instant the acceleration of the lift is $2m/s^2$. Calculate the reading on the scale at that instant. (2 marks)

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c) A resultant force F acts on a body of mass m causing an acceleration a_1 on the body. When the same force acts on a body of mass 2m, it causes an acceleration a_2. Express a_2 in terms of a_1.

(2 marks)

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d) The figure 12 below shows the load -extension curves for two materials A and B of the same diameter and same original length.
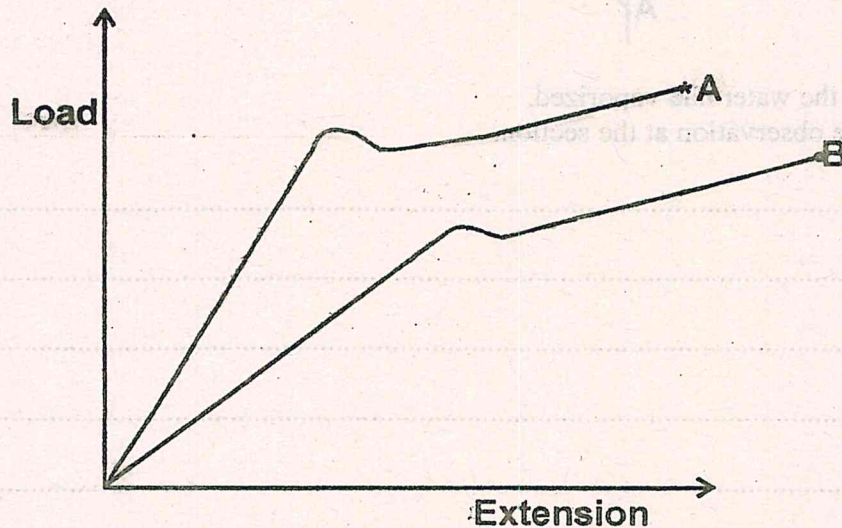
i) State with a reason which material is stronger. (2 marks)

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ii) Sketch on the same axes the graph for a material that is more stiffer than A. (1 mark)

Name ....

Candidate's Signature ....

Date ....

232 / 2
PHYSICS
Paper 2
End of Term 1 2018

Time: 2 Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

232/2
Physics paper 2

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- This paper consists of two sections; A and B
- All working and answers must be written on the question paper in the spaces provided below each question.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used
- All working MUST be shown clearly where necessary.

FOR EXAMIER'S USE ONLY

SECTION	QUESTIONS	MAX. SCORE	CANDIDATE'S SCORE
A	1 – 13	25	
B	14	11	
	15	12	
	16	9	
	17	11	
	18	12	
TOTAL		80	

1. The figure 1 below shows two rays leaving an object O to a place mirror. Draw the two reflected rays and use them to find the position of the image. .... (2 marks)

Fig. 1
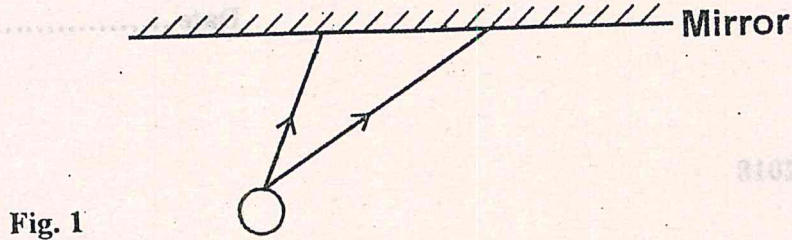
2. Explain why the image formed in a pin hole camera gets blurred when the hole is enlarged. (2 marks)

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3. A dentist has the choice of three mirrors, convex, concave and a plane mirror to examine the back of your teeth. State with a reason which mirror he should use. (2 marks)

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4. Figure 2 below shows an iron bar being magnetized by stroking it with a magnet.

Fig. 2
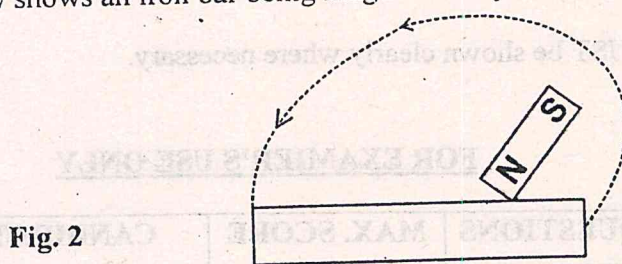
Indicate on the iron bar the polarity of the resulting magnet. (1 mark)

5. A sub marine sends a sound and receives the echo from a ship after 4.5 seconds. The speed of sound in water is 1500m/s. How far is the ship. (3 marks)

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6. State the role played by manganese dioxide in a dry cell.   (1 mark)

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7. Figure 3 shows a ray of white light falling on a triangular prism.

Fig. 3
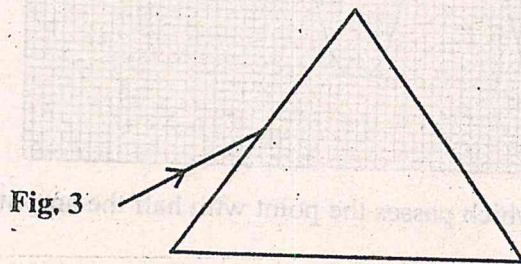
Complete the diagram to show the way light emerges through the prism.   (2 marks)

8. Figure 4 below shows a solenoid through which current is flowing.

Fig. 4
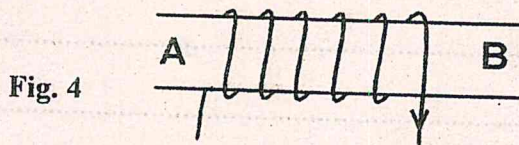
A compass needle is placed at point B. State with reason the compass needle points. (2 marks)

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9. Figure 5 below shows the image of an object by reflection in a converging mirror. C is the centre of curvature of the mirror.
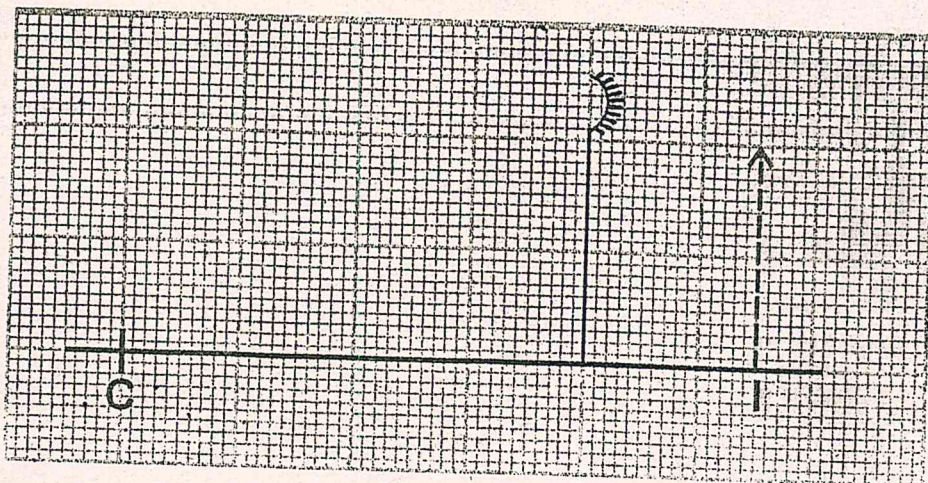
Fig. 5

Complete the diagram to show:
a) How incident rays are reflected from the image.
b) The object position.   (2 marks)
                                                                                 (1 mark)

10. Figure 6 shows how the displacement of a point varies with time as a wave passes it.
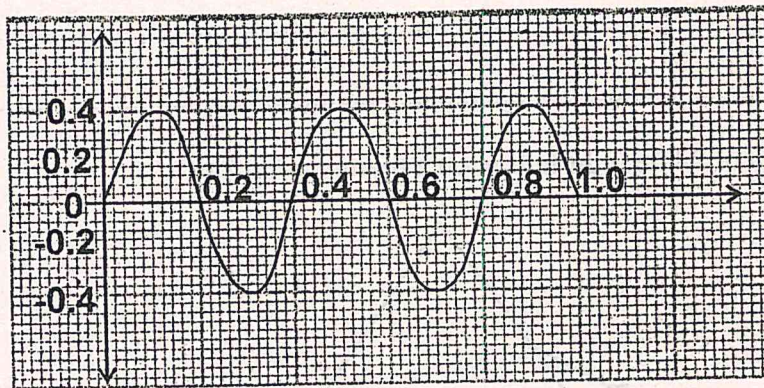
Fig. 6

On the same diagram draw a wave which passes the point with half the amplitude and twice the frequency of the one shown. (2 marks)

11. A positively charged sphere is suspended by an insulating thread. A negatively charged conductor is suspended near it. Explain the observation. (2 marks)

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12. A heating is rated 100W, 240W. At what rate would it dissipate energy if it is connected to a 220V supply. (2 marks)

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13. State one law of reflection. (1 mark)

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14. a) Explain why some vehicle tyres contain graphite. (2 marks)

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b) The figure below shows two isolated electric charges near each other.

Draw the resultant field due to the charges. (2 marks)

c) The diagram below shows three capacitors in an electric circuit.
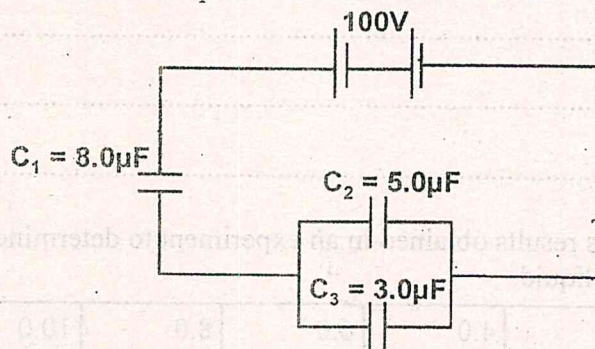
Calculate the;
i) Effective capacitance. (3 marks)

....

....

....

....

ii) p.d across C_1 (2 marks)

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15. a) Define refractive index of a material. (1 mark)

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b) A ray of light is incident on a water-glass interface as shown below.

Water n=1.33 40°

Glass n=1.5
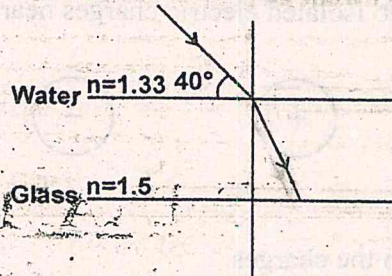
Calculate the angle of refraction in glass. (3 marks)

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c) The table below shows results obtained in an experiment to determine apparent depth of an object at various depths of a liquid.

Real depth (cm)	4.0	6.0	8.0	10.0	12.0
Apparent depth (cm)	2.4	3.6	4.8	6	7.20

i) Plot a graph of apparent depth (y-axis) against real depth. (5 marks)
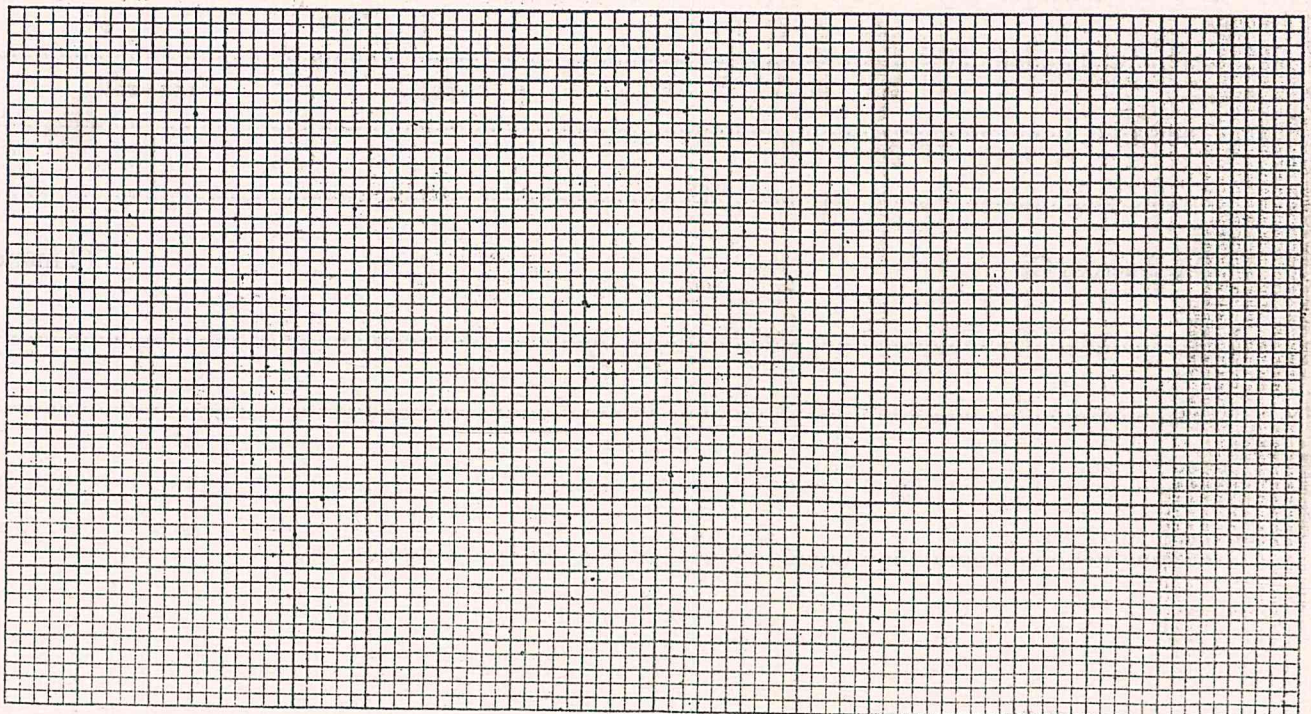
ii Use your graph to determine the refractive index of the liquid.. (3 marks)

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16. a) Define the term 'diffraction' as applied in waves. (1 mark)

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b) The figure below shows wave fronts before and after passing an opening.
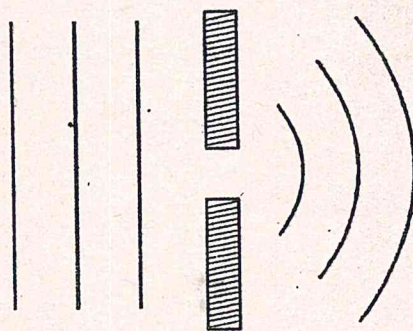
State what would happen on the pattern after passing the opening if:
i) The gap was made smaller. (1 mark)

....

....

ii) The wavelength was made very large. (1 mark)

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....

c) When a metre rule was placed in a ripple tank, it was noted that the distance between 12 successive dark lines (crest) was 30cm. The frequency of the vibrator was 20Hz. Determine:
i) The wavelength of the wave in the ripple tank. (2 marks)

....

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ii) The velocity of the waves over the water surface. (2 marks)

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....

....

iii) The periodic time of the waves. (2 marks)

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17. a) You are provided with two resistors of value 4Ω and 8Ω.
   i) Draw a circuit diagram showing the resistors in series with each other and with a battery. (2 marks)
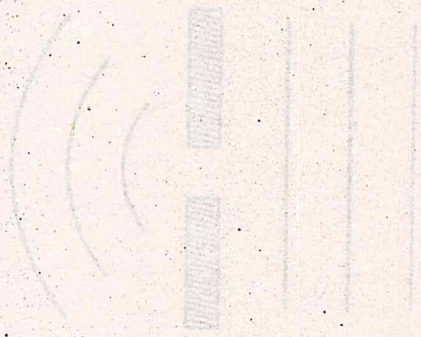
ii) Calculate the total resistor of the circuit (assume negligible internal resistance) (1 mark)

b) Given that the battery has an e.m.f of 6V and an internal resistance of 1.33Ω. Calculate the current through the 8Ω and 4Ω resistor when the two are in parallel. (5 marks)

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c) A battery circulates charge round a circuit for 1.5 minutes. If the current is held at 2.5 A, what quantity of charge passes through the wire. (3 marks)

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18. a) Figure below shows an object O placed infront of a mirror of focal length 10cm. C is the centre of curvature.
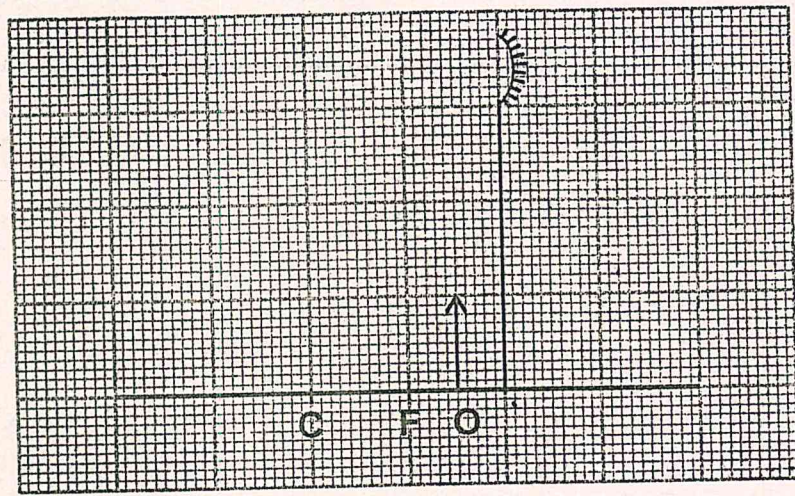
Fig. 12

i) On the same figure draw a ray diagram showing the location of the image. (3 marks)
Use your diagram in (a) (i) above to determine the:

ii) Image distance (1 mark)

....

....

iii) Magnification (2 marks)

....

....

....

b) A vertical object is placed 20cm infront of a convex lens of focal length 5cm.
Determine:
i) The image distance (2 marks)

....

....

....

ii) Magnification   (2 marks)

....

....

....

iii) One characteristics of the image formed.   (1 mark)

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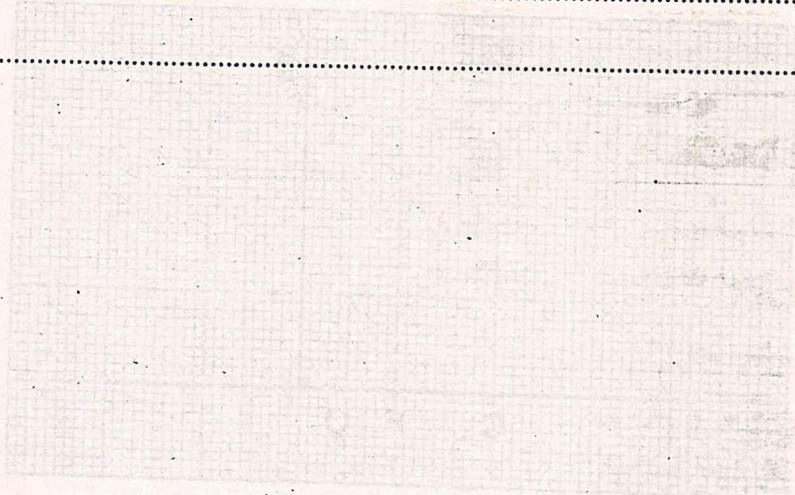
Name ....

School .... Candidate's Signature ....

Date ....,..

232 / 3
PHYSICS
Paper 3
(Practical)

End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

232/3
Physics paper 3

INSTRUCTIONS TO CANDIDATES

1. Answer all the questions in the spaces provided.
2. You are supposed to spend the first 15 minutes of the 2 ½ hours allowed in this paper reading the whole paper carefully before commencing your work
3. Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them
4. Candidates are advised to record their observation as soon as they are made
5. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidates Score
1	20	
2	20	
Total	40	

QUESTION 1

You are provided with the following;
- A metre rule
- Vernier callipers
- A 300g mass
- Two knife edges
- Some thread

<u>Proceed as follows:</u>

a) Place the metre rule on the knife edges such that each knife edge is 45cm from the 50cm mark (centre of the rule). See figure 1. Ensure that the millimetre scale of the metre rule is facing upwards. The distance L between the knife edges is now 900mm.

Place the vernier callipers vertically against the metre rule at the 50cm mark with the depth gauge lowered to touch the bench as shown in figure 1.

Record the height h_0, of the upper edge of the metre rule at the 50cm mark. (see figure 1)

$H_0 = $ .... mm

(1 mark)
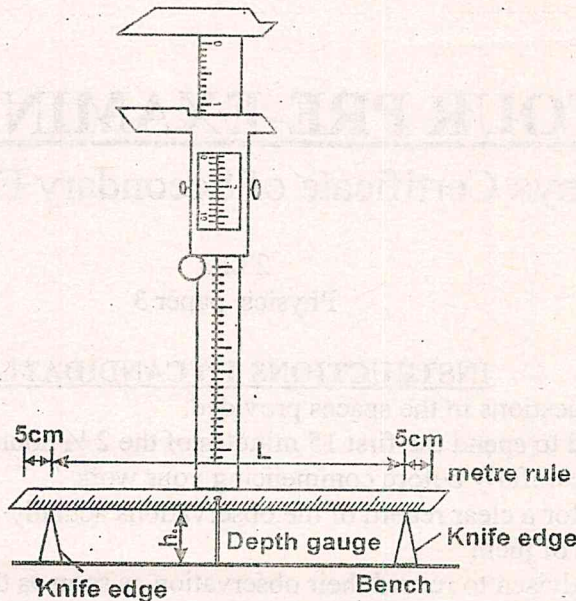
Figure 1.

b) Using the thread provided, hang the 300g mass at the 50cm mark of the metre rule. Ensure that the mass does not touch the bench. Measure and record in table 1, the height of the edge of the metre rule at the 50cm mark.

c) With the 300g mass still at the 50cm mark, adjust the position of the knife edges so that L is now 800mm. (The knife edges should be equidistant from the centre of the metre rule). Measure and record in table 1 the height h of the edge of the metre rule at the 50cm mark.

d) Repeat the procedure in (c) for other values of L shown in table 1. Complete the table.

Length L (mm)	900	800	700	600	500
Height h (mm)					
Depressions d(h_0-h)mm					
Log L					
Log d					

e) Plot a graph of L(y-axis) against log d. (5 marks)
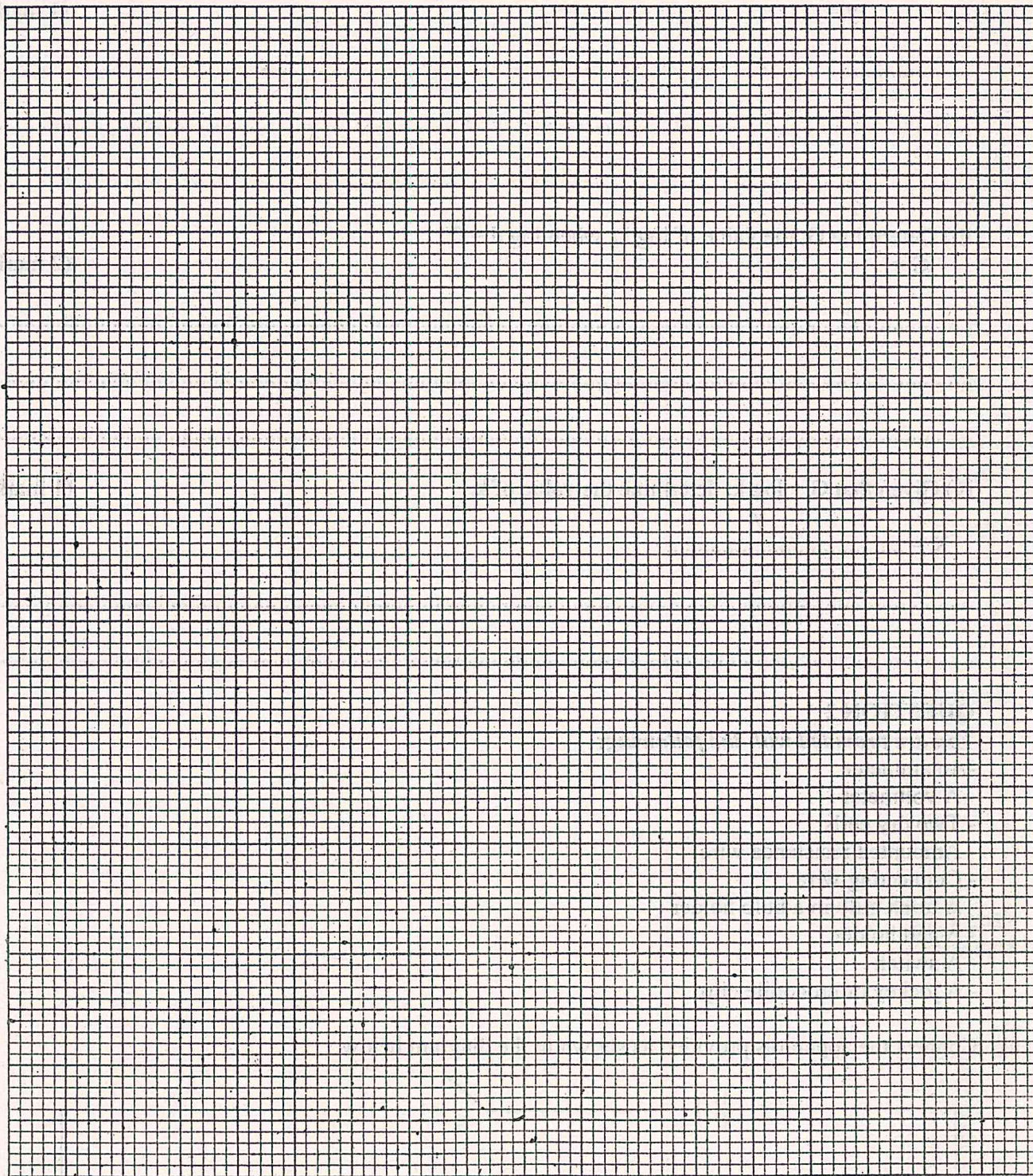
f) i) Determine the slope S of the graph. (3 marks)

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ii) Evaluate $y = \frac{1}{s}$

y = ...

(1 mark)

....

....

....

iii) Determine G, the value of log L, when log d = 0.

G =

(2 marks)

....

....

....

iv) Given that $G = \frac{\log k}{y}$, determine the value of k.

(1 mark)

K = ...

....

....

QUESTION 2
You are provided with the following;
-An ammeter
- A voltmeter
- Two dry cells
- Amounted resistance wire
- Connecting wire
- A torch bulb in a bulb holder
- A cell holder
- A switch
- A jockey or crocodile clip

a) Connect the apparatus provided as shown in the diagram below.
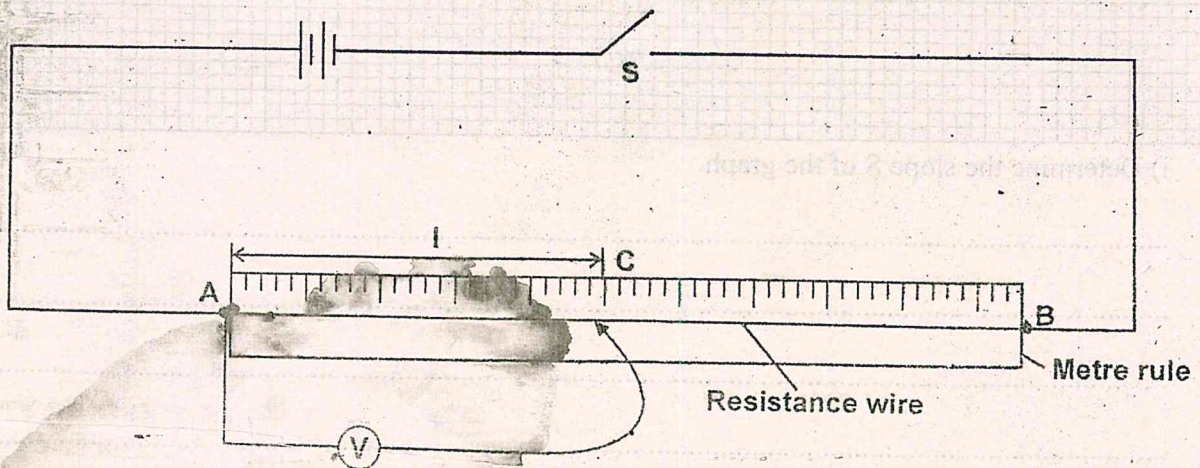
b) With the jockey at c, 10cm from A record the voltmeter reading in the table below.

Length L (cm)	10	20	30	40	50	60	70	80	90
P.d (V)									

c) Repeat the experiment in (b) above for the following length;
   L = 20cm, 30cm, 40cm, 50cm, 60cm, 70cm, 80cm, 90cm, respectively.

d) Plot the graph of p.d against length L(cm).

(5 marks)
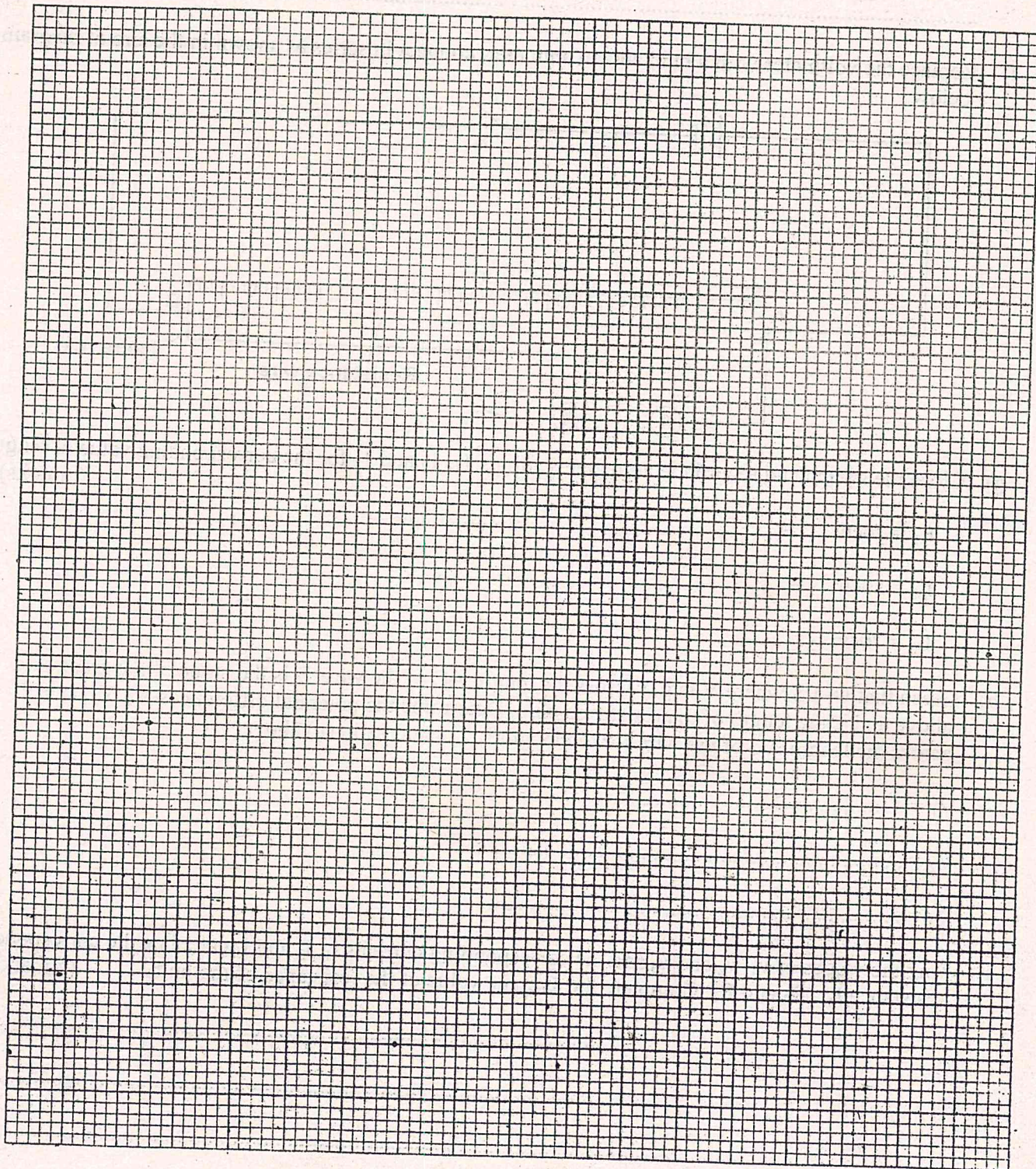
e) Determine the slope of the graph.

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f) Replace the voltmeter with a bulb and an ammeter, connect in series as shown in the circuit diagram below.
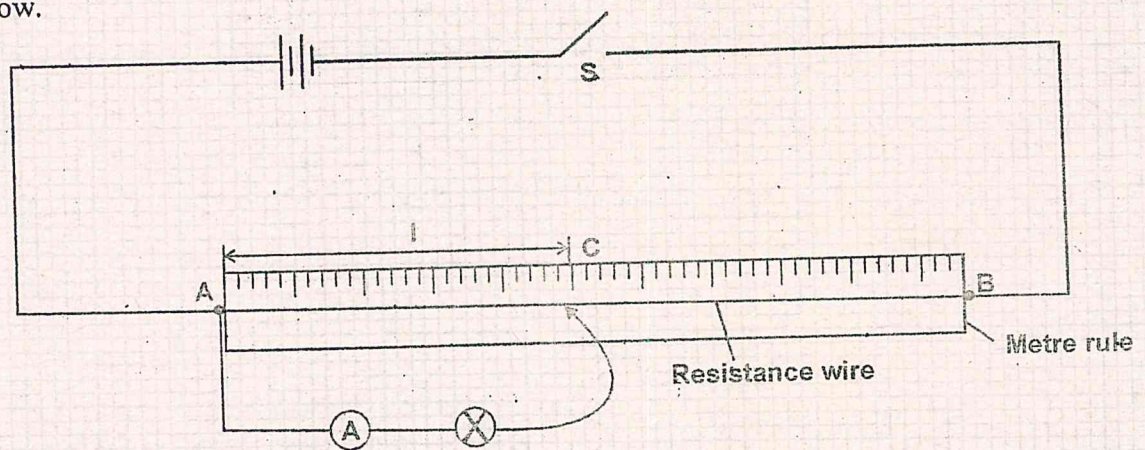
g) Close the switch and record the ammeter readings I_1, I_2 and I_3 for the corresponding value of length.

(3 marks)

$L_1 = 30cm$ $I_1 =$ ....

$L_2 = 50cm$ $I_2 =$ ....

$L_3 = 70cm$ $I_3 =$ ....

h) Given that $v = LS$ where V is p.d across the length AC of the wire. S is the slope of the graph in d above and L the length of the resistance wire. Determine the potential differences V_1, V_2, and V_3 across the length AC of the wire for the length L_1, L_2 and L_3 in (g) above.

$V_1 =$ ....

$V_2 =$ ....

$V_3 =$ ....

i) Sing the values of v_1, v_2 and v_3 and the corresponding currents i_1, i_2 and i_3 calculate the corresponding resistance R_1, R_2 and R_3. Complete the average value of the resistance of the bulb. (2 marks)

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Name ....

Candidate's Signature ....

Date ....

311 / 1
HISTORY & GOVERNMENT
Paper 1
End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

311/1
History and Government   paper 1

INSTRUCTIONS TO CANDIDATES

- This paper consists of three section; **A, B** and **C**
- Answer All the questions in section A, **three** questions from section B and **two** questions in section C
- Answers must be written in the answer booklet provided.

SECTION A (25MARKS)

Attempt all the questions in this section.

1. State **two** ways in which the Kenyan constitution promotes national unity. (2mks)
2. State **two** aspects of Luo social organization. (2mks)
3. Name the family that ruled Island of Lamu in 19th century. (1mk)
4. Give the **main** results of second Anglo-Maasai agreement of 1911. (1mk)
5. Give **two** methods used by British to establish colonial rule in Kenya. (2mks)
6. State the **two** reasons why colonial government denied Africans higher education. (2mks)
7. Give **two** problems faced by early political organizations. (2mks)
8. Name **two** types of elections in Kenya. (2mks)
9. Identify the **main** reason for the formation of Kenya African Democratic Union in 1960. (1mk)
10. Who takes office on interim basis incase the office of Governor and deputy governor are left vacant in the county. (1mk)
11. Give the number of elected members (senators) in the house of the senate. (1mk)
12. Idenutfy **two** contributions of John Kraft to the spread of Christianity in Kenya during 19th century (2mks)
13. Name the company that administered Kenya on behalf of the British up to 1895. (1mk)
14. Name **one** group of eastern Cushites in Kenya by the 19th century. (1mk)
15. Mention **two** roles observed play during general election in Kenya. (2mks)
16. Name the constitution minister in Kenya who was assassinated in 1969? (1mk)
17. Who chairs cabinet meetings in Kenya. (1mk)

SECTION B (45mks)
Answer any THREE questions from this section

18. a) Name **three** commissions which have been appointed to advice the government on change education since independence. (3mks)
    b) Describe the achievements of education sector in Kenya since independence. (12mks)

19. a) Identify **three** levels of conflicts. (3mks)
    b) Explain **six** ways in which conflicts may have a negative effect in Kenya. (12mks)

20. a) Give **three** reasons why the Bantu migrated from their coastal settlements at shungwaya in the 16th century. (5mks)
    b) Describe political organization of the Akamba during pre-colonial period. (10mks)

21. a) State **three** reasons why the Portuguese were able to conquer the Kenyan coast during the 16th century. (3mks)
    b) Explain **six** factors which led to the collapse of the Portuguese rule on the Kenya coast by end of 17th century. (12mks)

SECTION C (30 mks)
Answer any TWO questions from this section.

22. a) State **five** methods used by the nationalists in Kenya to struggle for independence. (5mks)
    b) Explain **five** factors that enabled the Nandi to resist the British invasion for a long time. (10mks)

23. a) State **five** functions of a presiding officer in the electoral process in Kenya. (5mks)
    b) Explain **five** ways in which parliamentary supremacy is exercised in Kenya. (10mks)

24. a) Identify **three** factors to be considered before changing a county boundary. (3mks)
    b) Explain **six** advantages of devolved government. (12mks)

Name ....

Candidate's Signature ....

Date ....

311 / 2
HISTORY & GOVERNMENT
Paper 2
End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

311/2
History and Government   paper 2

INSTRUCTIONS TO CANDIDATES

- This paper consists of three section: **A, B** and **C**
- Answer **All** the questions in section A, any **three** questions in section B **and** any **two** questions in section C in the spaces provided.
- Answer to all the questions must be written in the answer booklet provided
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.

SECTION A: (25marks)
Answer all questions from this section

1. Give **two** reasons why early human beings lived in groups. (2mks)
2. Name **two** sub species of homo sapiens (2mks)
3. State the **methods** of writing invented Mesopotamia (1mk)
4. Identify the **main** discovery which promoted road transport (1mk)
5. State **one** theory that explain how iron working spread in Africa. (1mk)
6. Name **two** early urban centres in Europe. (2mks)
7. Give the **main** function of black stool among the Ashanti (1mk)
8. Name the FRELIMO leader in Mozambique who was assassinated in 1969. (1mk)
9. State **two** factors that led to decline of Athens city state. (2mks)
10. Give **two** reasons why the Africans in Tanganyika were against the use of Akidas by the Germany colonial administration. (2mks)
11. Name the policy of administration used by the Portuguese in their colonies. (1mk)
12. Identify **two** reasons why the Portuguese built the Fort Jesus. (2mks)
13. Identify **one** form of oral tradition source of history and government information. (1mk)
14. Name the treaty signed between samori toure and the French during the scramble and partitioning of Africa. (1mk)
15. State **two** reasons why the British applied indirect system and administration in Northern Nigeria. (2mks)
16. Name the **person** who convened the infamous Berlin conference 1884-1885 during the partition of Africa. (1mk)
17. Identify **two** companies used by European countries to administer their spheres of influence on their behalf during scramble and partition of Africa. (2mks)

SECTION B: (45 MARKS)
Answer three questions from this section.

18. a) Identify **one** West Africa town that grew during the trans-Saharan trade. (1mk)
    b) Name **two** West Africa rulers who contributed to the growth of trans-Saharan trade. (2mks)
    c) Explain the factors that led to the growth of trans-Saharan trade. 12mks

19. a) Identify **three** ways in which water was used in industries during the 19th century. (3mks)
    b) Explain **six** challenges facing industrialization in South Africa. (12mks)

20. a) State the **reasons** why man domesticated animals. (5mks)
    b) Explain **five** effects of agrarian revolution in Britain. (10mks)

21. a) Give **three** uses of wood as an early source of energy. (3mks)
    b) Briefly explain the effects of iron working in Africa. (12mks)

SECTION C (30MARKS)
Answer two questions only

22. a) State **two** types of constitutions. (2mks)
    b) List **three** functions of a constitution. (3mks)
    c) Explain the **main** sources of the British constitution. (10mks)

23. a) List **three** races who live in South Africa today. (3mks)
    b) Explain **six** reactions of the black people in South Africa against the apartheid policies. (12mks)

24. a) Name **three** territories in Africa where direct rule was used. (3mks)
    b) Explain **six** consequences of assimilation in Senegal. (12mks)

313 / 1
CHRISTIAN RELIGIOUS EDUCATION
Paper 1
End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018
Kenya Certificate of Secondary Education

313/1
C.R.E   paper 1

INSTRUCTIONS TO CANDIDATES
- This paper consists of SIX (6) questions.
- Answer any FIVE questions in the answer sheets provided

This paper has 2 printed pages
Candidates should check the questions paper to ensure that all the pages are printed as indicated and no questions are missing.

1. a) State seven contributions of Christians Religious Education to the development of a student

   7mks)

   b) What are the causes of sin from the Biblical stories of creation? (Genesis 2-3)   (6mks)

   c) Give seven reasons why reading the Bible is important to the Christians.   (7mks)

2. a) Explain how God prepared Moses to be the future leader of the covenant people.   (7mks)

   b) Give four reasons why God rescued the Israelites from Egypt.   (8mks)

   c) What lessons can a Christian learn from the call of Moses.   (5mks)

3. a) Outline seven promises given to King David through prophet Nathan (2 Samuel 7:1-29) (7mks)

   b) Mention how Jeroboam I promoted schism in Israel   (7mks)

   c) Mention six ways in which Christians show their trust in God.   (6mks)

4. a) Identify five social evils condemned by prophet Amos.   (5mks)

   b) According to prophet Amos, why would God punish other nations?   (7mks)

   c) Explain eight evils that a true Christian can condemn in Kenya today.   (8mks)

5. a) Explain the WAIST CLOTH as a symbolic act of Jeremiah on judgement and restoration. (8mks)

   b) Give FIVE occasions when Nehemiah prayed during his mission.   (5mks)

   c) How is Nehemiah's exemplary life relevant to Christian today.   (7mks)

6. a) Why are myths important in Traditional African Community?   (5mks)

   b) Identify eight ways in which names were chosen in Traditional African Community.   (8mks)

   c) Identify various aspects of Traditional African worship that have been incorporated in Christian worship.   (7mks)

Name ....

Candidate's Signature ....

Date ....

313 / 2
CHRISTIAN RELIGIOUS EDUCATION
Paper 2
End of Term 1 2018

Time: 2 ½ Hours

FORM FOUR PRE-EXAMINATION 2018

Kenya Certificate of Secondary Education

313/2
C.R.E   paper 2

INSTRUCTIONS TO CANDIDATES

- Answer any **FIVE** questions in the booklet provided.
- *This paper has 2 printed pages.*
- *Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.*

1. a) Explain <u>six ways in which</u> Jesus fulfilled the prophecy given to king David by prophet Nathan. (6mks)

   b) Identify <u>four</u> ways in which Jesus observed the religious practices of the Jews. (8mks)

   c) Identify the challenges that parent experience today in their task of bringing up their children. (6mks)

2. a) Describe the healing of the centurion's servant (Lk 7:1- 10). (7mks)

   b) Explain <u>seven</u> ways in which the disciples of Jesus showed their support to his ministry. (7mks)

   c) Identify <u>six</u> activities a Christian can do in order to be considered a true follower of Jesus. (6mks)

3. a) With specific examples identify four types of miracles performed by Jesus. (8mks)

   b) Give <u>six</u> reasons why some people did not recognise the authority of Jesus. (6mks)

   c) Explain reasons why some Christians are sceptical about miracles today. (6mks)

4. a) Relate the parable of the Pharisee and the tax collector. (Luke 18:9-14) (8mks)

   b) Identify <u>six</u> signs of the end time as taught by Jesus. (6mks)

   c) How can Christians prepare themselves for the second coming of Jesus. (6mks)

5. a) Explain how the use of the Holy Spirit gifts brought disunity in the church at Corinth. (6mks)

   b) Outline teaching of Paul on the unity of believers as demonstrated in the image of the body of Christ (1 Cor 12: 8-31) (7mks)

   c) Explain <u>seven</u> factors that threaten unity in the Church today. (7mks)

6. a) Identify <u>five</u> fruits of the Holy Spirit. (5mks)

   b) Explain <u>seven</u> roles of the Holy Spirit as taught by Jesus. (7mks)

   c) Outline various ways in which Christians demonstrate the fruit of Holy Spirit. (8mks)