NAME_____INDEX NO._____

CANDIDATE'S SIGNATURE_____

DATE :_____

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

Kenya Certificate of Secondary Education (K.C.S.E.)
231/2
BIOLOGY 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.
- In Section B answer questions 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.
- Answer all the questions in the spaces provided.
- Candidates should answer all the questions in English.

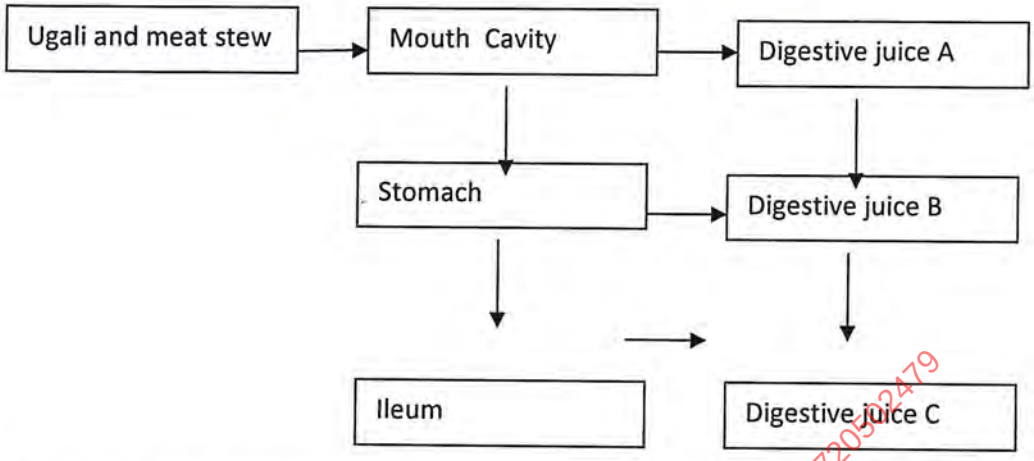
For Examiners' use ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
	6	20	
	7	20	
	8	20	
TOTAL		80	

SECTION A (40 Marks)

INSTRUCTIONS* – *Answer ALL the questions in this section in the spaces provided.

1. The flow diagram below represents passage of a meal through the human digestive system. Study the diagram and answer the questions that follow:-



a) Name the physical process that will occur in mouth cavity. (1 mark)

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b) Name the digestive juices B and C. (2 marks)

B _____

C _____

c) Explain two ways in which the digestive system is protected from corrosive effects of digestive juices. (2 marks)

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d) Name the hormone that stimulates secretion of juice B. (1 mark)

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e) Identify two contents of digestive juice A. (2 marks)

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2.a) Each human somatic (body) cell has 46 chromosomes in its nucleus. How many of these are sex chromosomes? (1 mark)

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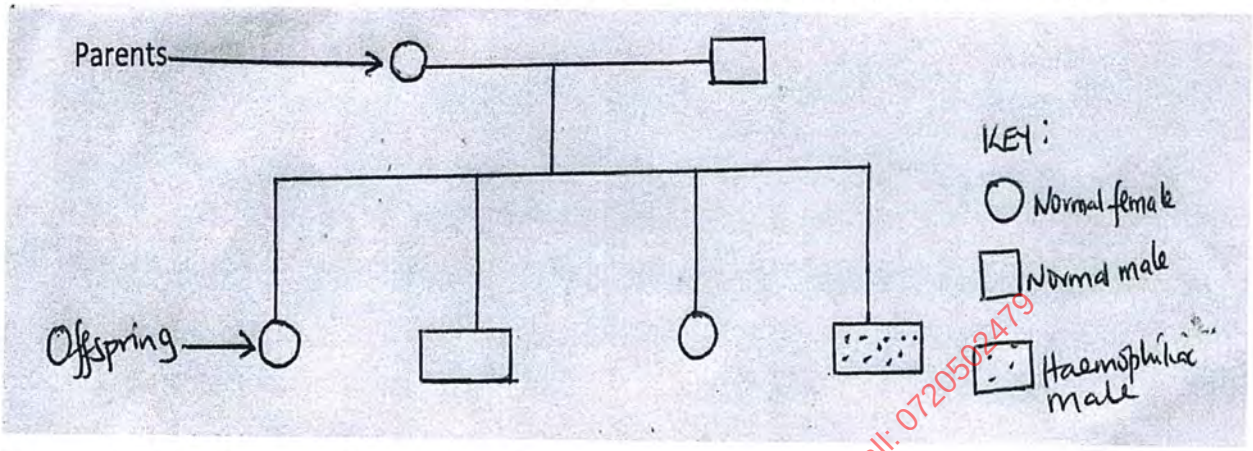
b) Haemophilia is due to a recessive gene. The gene is sex-linked and located on the x-chromosome. The figure below shows some offspring from phenotypically normal parents.



i) What are the parental genotypes?

Father_____Mother_____ (2 marks)

ii) Work out the genotypes of the offspring. (2 marks)

c) State <u>two</u> other disorders in humans that result from gene mutation. (2 marks)

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3.a.i) Name the cartilage found between the bones of the vertebral column. (1 mark)

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ii) What are the functions of the cartilage named in a.(i) above? (3 marks)

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b) State <u>two</u> ways by which plants compensate for lack of ability to move from one place to another. (2 marks)

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c) State adaptations of the following tissue in plants. (2 marks)

i) Collenchyma tissues.

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ii) Sclerenchyma tissues.

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4. The table below shows the contents of urine compared to blood plasma and glomerular filtrate in a mammal. Study it and answer the questions that follow:-

Component	Plasma g/cm^3	Glomerular g/100 cm^3	Urine g/100 cm^3
Urea	0.04	0.04	2.10
Uric acid	0.005	0.005	0.07
Glucose	0.20	0.20	0.00
Amino acids	0.07	0.07	0.00
Plasma proteins	9.00	0.00	0.00
Salts	0.84	0.84	1.96

a) Account for the absence of:-

i) Plasma protein in glomerular filtrate. (1 mark)

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ii) Glucose and amino acids in urine. (1 mark)

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b) From the results above, identify two types of wastes eliminated from the mammalian blood through the kidney. (2 marks)

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c) Give a reason why kidney tubules are highly coiled. (1 mark)

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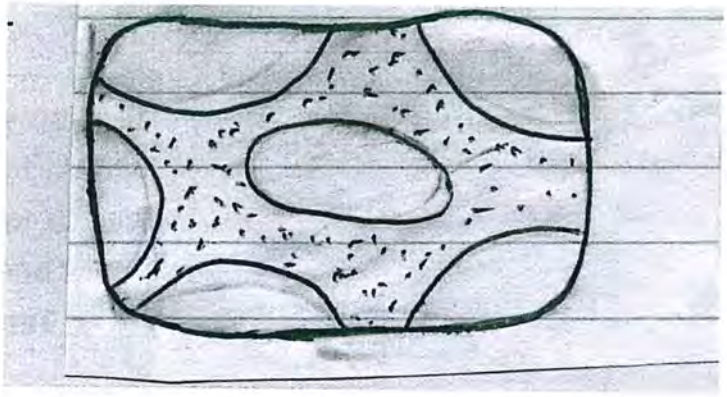
d) Name the hormone responsible for:-

i) Reabsorption of water. _____ (1 mark)

ii) Reabsorption of sodium chloride. _____ (1 mark)

e) Name one kidney disease._____ (1 mark)

5. A student placed a plant cell in solution X for 30 minutes. The cell appeared as shown in the diagram below:-



a) What is the nature of solution X? (1 mark)

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b) State the process that makes the cell appear as shown in the diagram. (1 mark)

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c) Account for the shape of the cell after 30 minutes. (3 marks)

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d) Explain what would happen if a red blood cell is placed in distilled water. (3 marks)

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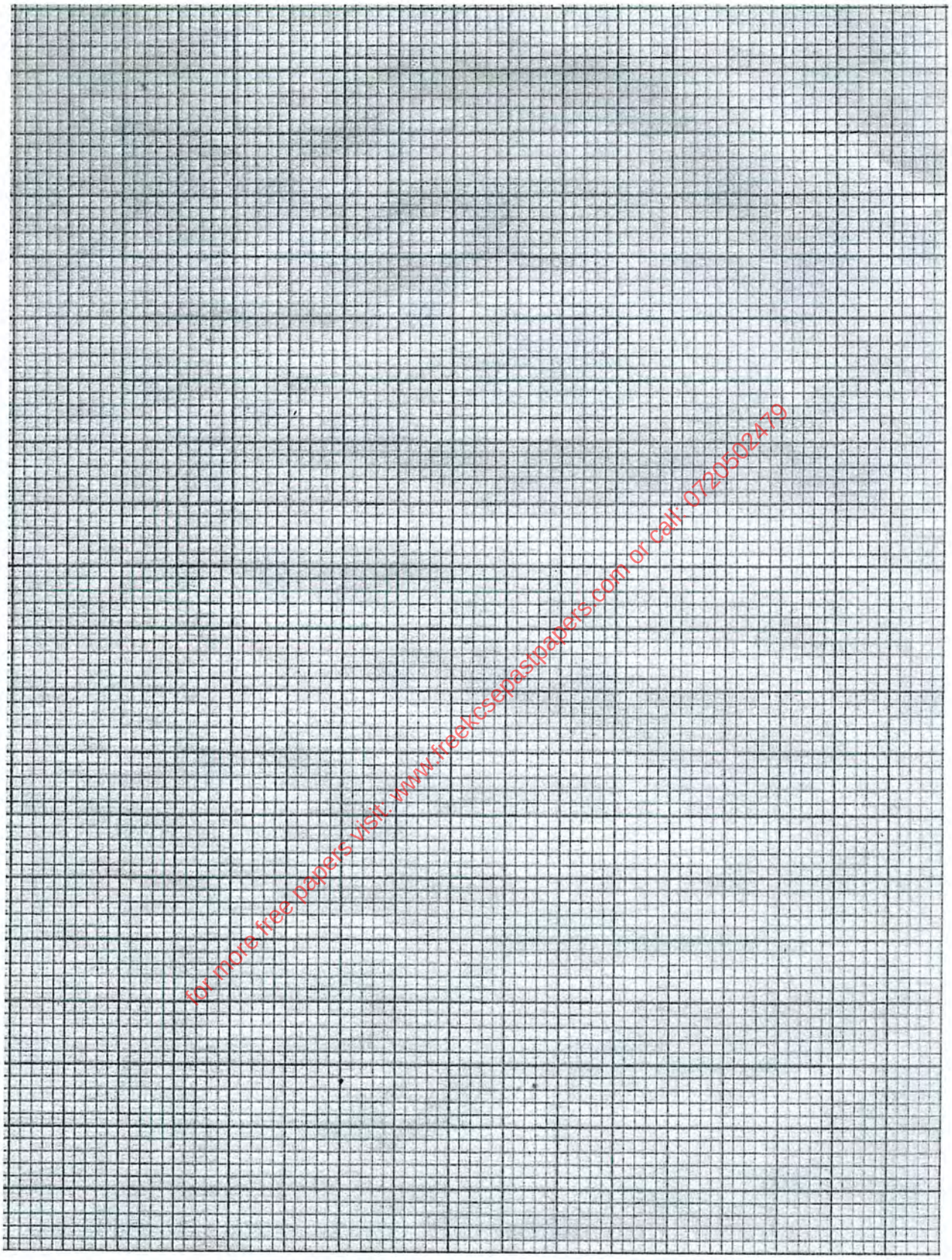
SECTION B (40 Marks)

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

6. In a study on immunity, two groups of mice were immunized with sheep blood (0.1 m l or 20% cell suspension). One of the groups was given 5 dozes of a drug Tinocordine (50 mg each) prior to immunization. The second group was not treated with Tinocordine. Blood was collected from each group every third day for one month. The results were as shown in the table below:-

NO. OF DAYS AFTER IMMUNIZATION	ANTIBODIES(ARBITRARY UNITS	
	TINOCORDINE TREATED MICE	NON-TINOCORDINE TREATED MICE
3	15	5
6	20	5
9	30	15
12	60	25
15	122	30
18	250	30
21	122	30
24	60	30
27	37	22
30	27	5

a) Plot graphs using the same axes to display the results above. (8 marks)



b) What is the effect of Tinocordine on the immune system? (1 mark)

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c) Determine the rate of antibody production between day 13 and 17 in:-

i) Tinocordine treated Mice. (2 marks)

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ii) Non-Tinocordine treated mice. (2 marks)

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d.i) What type of immunity is described in the information above? (1 mark)

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ii) Name another type of immunity. (1 mark)

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e) Name the causative agent of AIDs in humans and state its effect on the body. (2 marks)

Agent Effect:.....

Effect:.....

f) Name <u>three</u> diseases in human beings here vaccination is done. (3 marks)

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7.a) Describe the sequence of events from the time a mature pollen grain is deposited on the stigma until an endosperm is formed. (16 marks)

b) State the adaptations of fruits and seeds to dispersal by water. (4 marks)

8.a) During a voting exercise tension was high. One of the aspirants was furious and wanted to face a very aggressive opponent. Explain the physiological changes that occur in his body to prepare him for the fight. (14 marks)

b) Identify each of the following responses described below:-

i) A person coughs whenever a foreign body irritates the respiratory tract. (1 mark)

ii) Whenever a bell is rung, a dog is presented with a meal. After several days of practice, the dog salivates once the bell is rung even if food is not available. (1 mark)

c) State the differences between the two responses identified in (b) above. (4 marks)