NAME…….. INDEX NO…….....

231/1 **CANDIDATE'S SIGN……..……..**
BIOLOGY
PAPER 1 **DATE……..……**
(THEORY)
JULY/AUGUST, 2015
TIME: 2 HOURS

KIRINYAGA CENTRAL SUB-COUNTY JOINT EXAMINATION - 2015

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 1
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Write your **Name**, **Index Number** and **School** in the spaces provided above.
2. **Sign** and write the **date** of examination in the spaces provided above.
3. Answer **all** the questions in the spaces provided.
4. Answers must be written in the spaces provided in the question paper.
5. Additional pages **must not** be inserted.

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1 - 26	80	

1. Name the organelles that are abundant in:

   (a) Goblet cells _____ (1 mark)

   (b) Liver cells _____ (1 mark)

2. Give a reason why it is difficult to calculate Respiratory Quotient (RQ) in plants. (2 marks)

   _____

   _____

   _____

   _____

3. List **three** advantages of asexual reproduction in plants. (3 marks)

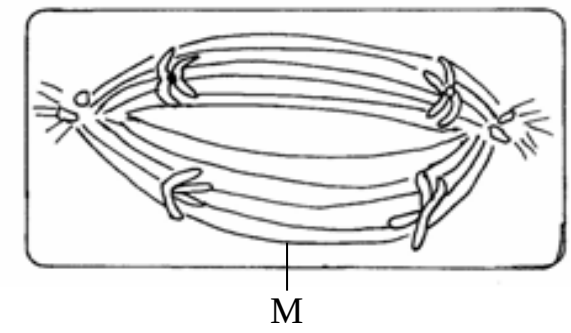
   _____

   _____

   _____

   _____

4. The diagram below represents a stage during cell division.



   (a) (i) Identify the stage of cell division. (1 mark)

   _____

   (ii) Give a reason for your answer. (1 mark)

   _____

   _____

(b) Name the structures labelled **M**. (1 mark)

5. Explain why there is increased heart beat during vigorous exercise in man. (2 marks)

6. (a) State **two** characteristic features of members of division pteridophyta. (2 marks)

(b) Give **one** way in which pteridophyta differ from spermatophyta. (1 mark)

7. (a) Explain the role of antidiuretic hormone when there is excess water in the human body. (3 marks)

(b) State the kidney disorder characterized by production of large volume dilute urine. (1 mark)

_____

_____

8. (a) State **one** role of each following hormones in the menstrual cycle.

(i) Follicle stimulating hormone. (1 mark)

_____

_____

_____

(ii) Luteinising hormone. (1 mark)

_____

_____

_____

(b) Explain why hormone testosterone still exerts it's influence even when vas deferens have been cut. (2 marks)

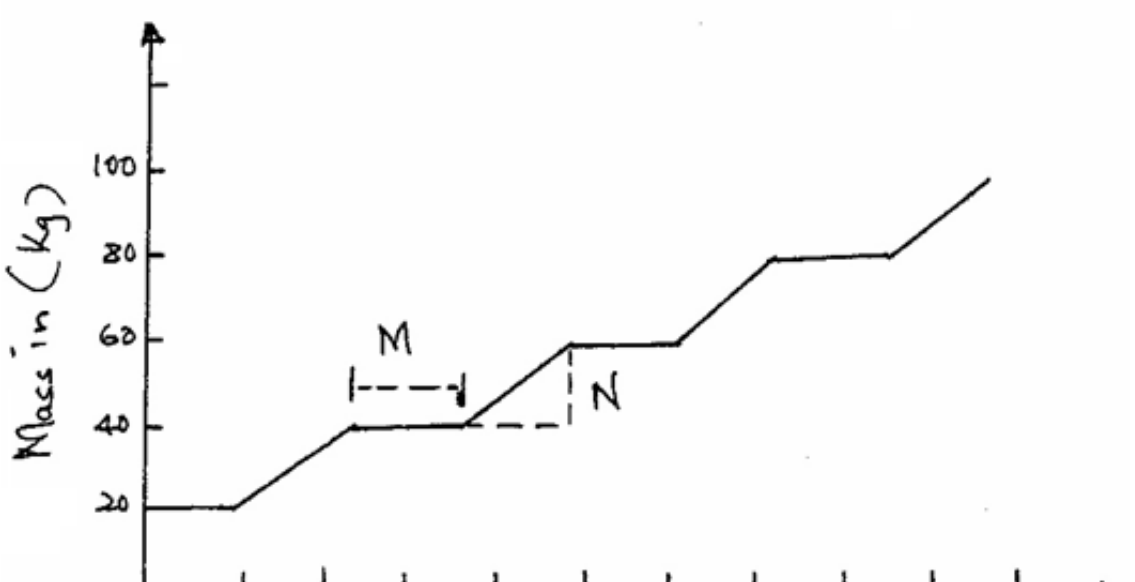
_____

_____

_____

_____

9. The graph below represents growth pattern in a certain group of animals. Study it and answer the questions that follow.



(a) Name the type of growth curve. (1 mark)

_____

(b) Name the animal phylum that shows this type of growth pattern. (1 mark)

_____

(c) Name the process that occurs in part **M**. (1 mark)

_____

10. (a) Name the bacteria found in ceacum of herbivores. (1 mark)

_____

(b) State the association of the bacteria named in (a) above with herbivores. (1 mark)

_____

_____

_____

11. During germination and early growth, the dry weight of endosperm decreases while that of the embryo increases. Explain. (2 marks)

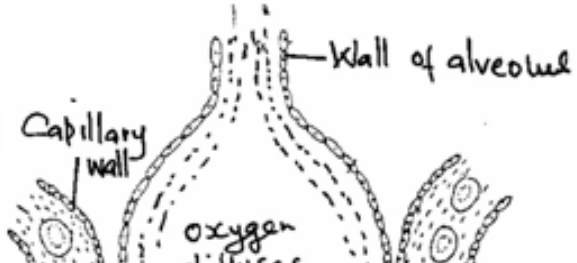
_____

_____

_____

_____

12. The figure below shows an alveolus in which gaseous exchange take place.



(a) (i) Define the term diffusion. (1 mark)

_____

_____

_____

(ii) What causes oxygen to diffuse into the blood from the alveoli? (1 mark)

_____

_____

(iii) List **two** features of gaseous exchange surfaces in animals, such as humans that are evident in the diagram above. (2 marks)

_____

_____

_____

_____

13. State **two** characteristics that researchers use/select in breeding programmes. (2 marks)

_____

_____

_____

14. (a) Which component of the blood gives the body immunity? (1 mark)

_____

(b) Distinguish between natural and acquired immunity. (2 marks)

_____

15. (a) Define ‘osmosis’. (2 marks)

(b) State the importance of osmosis in plants. (2 marks)

16. (a) Give **two** evidences that support the theory of organic evolution. (2 marks)

(b) Why is Lamarcks theory of evolution not accepted by biologists today. (2 marks)

17. The number and distribution of stomata on three different leaves are shown in the table below.

Leaf	Number of stomata	
	Upper epidermis	Lower epidermis
A	300	0
B	150	200
C	2	13

(a) Suggest the possible habitat of the plant from which the leaves were obtained. (3 marks)

Leaf Habitat

A _____

B _____

C _____

(b) State **one** modification found in the stomata of leaf **(C)**. (1 mark)

_____

_____

_____

18. (a) State **one** way through which herbaceous plants achieve support. (1 mark)

_____

_____

_____

(b) Name **three** supporting tissues in plants. (3 marks)

_____

_____

_____

_____

19. (a) One of circulatory systems in animals is open circulatory system. Give the name of the other type of circulatory system found in animals. (1 mark)

(b) State **two** advantages of the circulatory system you have named in (a) above. (2 marks)

20. State **two** advantages of metamorphosis to the life of insects. (2 marks)

21. There are at least 205 known sex-linked recessive disorders.
(a) What is meant by term sex-linkage? (2 marks)

(b) Name **two** sex-linked traits in humans. (2 marks)

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

(a) Name the defect. (1 mark)

_____

(b) Explain how the defect named in (c) above can be corrected. (2 marks)

_____

_____

_____

_____

23. (a) State the importance of the following processes that take place in the nephron of a human kidney.

(i) Ultrafiltration. (1 mark)

_____

_____

_____

(ii) Selective reabsorption. (1 mark)

_____

_____

_____

(b) In which part of the nephron does ultrafiltration take place? (1 mark)

_____

24. A biological washing detergent contains enzymes which remove stains like mucus

and oils from clothes which are soaked in water with the detergent.

(a) Name the two groups of enzymes that are present in the detergent. (2 marks)

_____

_____

_____

_____

(b) Why would the stains be removed faster with the detergent in water at 35°C rather than at 15°C? (2 marks)

_____

_____

_____

_____

25. Explain why it is important to go for Voluntary Counselling and Testing (VCT) on HIV/AIDS. (2 marks)

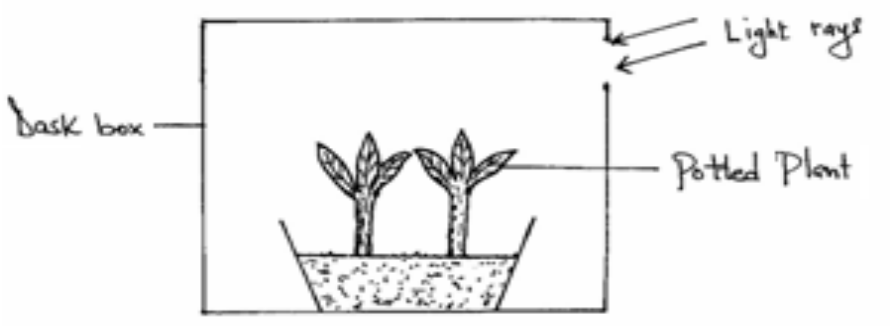
_____

_____

_____

_____

26. In an experiment young potted seedlings were placed in a dark box with unilateral light source as shown below.



(a) What was the aim of the experiment? (1 mark)

_____

_____

_____

(b) State the observation made of on the seedling after 3 days. (2 marks)

_____

_____

_____

_____

NAME…….. INDEX NO…….....

231/2 **CANDIDATE'S SIGN……..……..**
BIOLOGY
PAPER 2 **DATE……..……**
(THEORY)
JULY/AUGUST, 2015
TIME: 2 HOURS

KIRINYAGA CENTRAL SUB-COUNTY JOINT EXAMINATION - 2015

Kenya Certificate of Secondary Education
BIOLOGY
PAPER 2
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

- Write your **name**, **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**.
- Answer all the questions in Section **A** in the spaces provided.
- In Section **B** answer question **6 (Compulsory)** and either question **7** or **8** in the space provided after question **8**.
- Check to ascertain that all pages are printed and that no questions are missing.

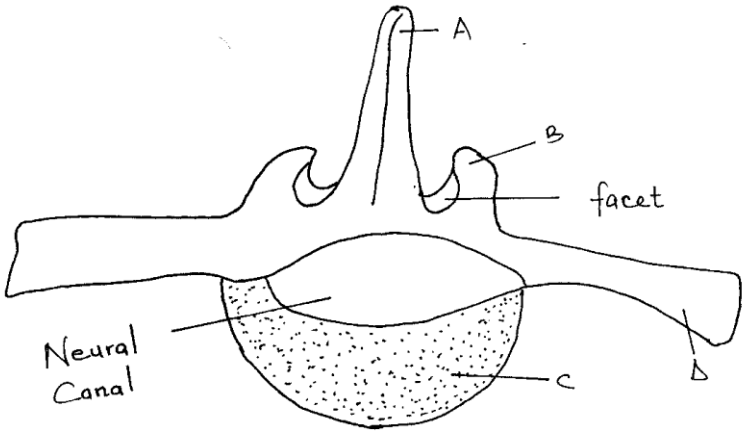
FOR EXAMINER'S USE ONLY:

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	
Total Score		80	

SECTION A: (40 MARKS)

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

1. Study the diagram shown below of the anterior view of a lumbar vertebra of a mammal.



(a) Name the parts labelled: (3 marks)

A _____

B _____

C _____

(b) State the function of the part labelled **D**. (1 mark)

_____

_____

_____

(c) State **three** roles of skeletons in organisms. (3 marks)

_____

_____

_____

_____

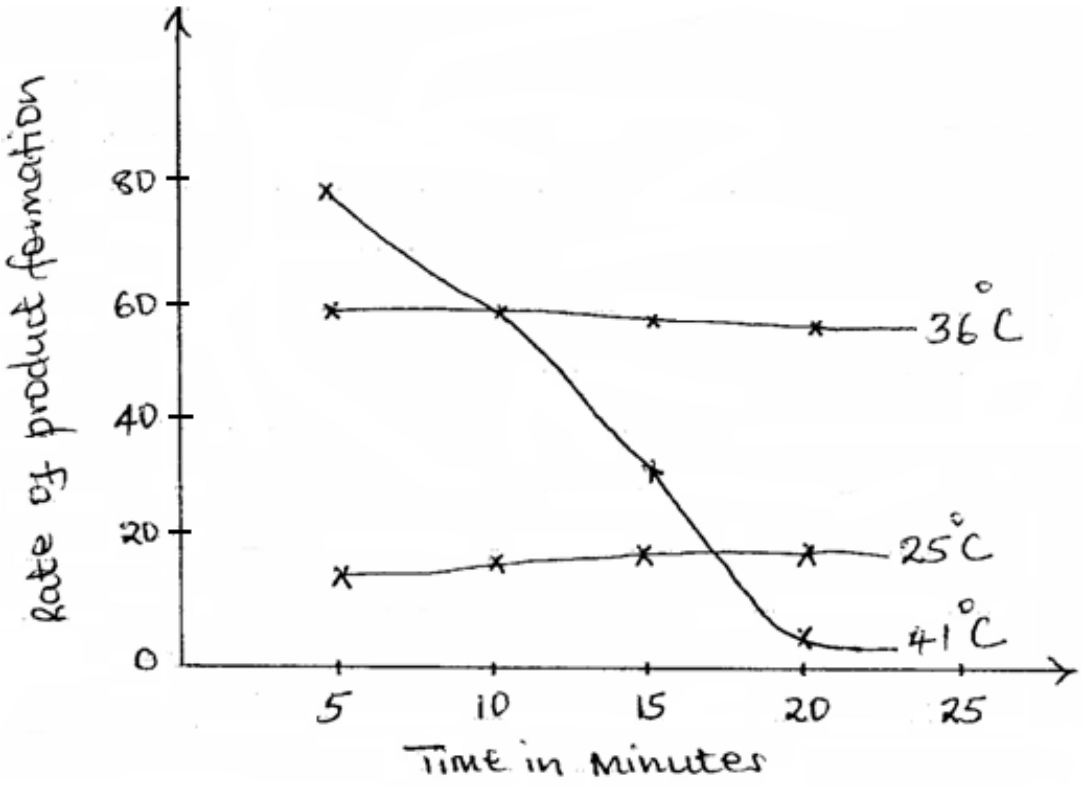
(d) State how the part labelled **D** in adapted for the function stated in (b) above. (1 mark)

_____

_____

_____

2. The graph below shows rates of photosynthesis in a plant at different temperatures.



(a) Account for the decrease in the rate of product formation at 41°C from 5 to 20 minutes. (2 marks)

_____

_____

_____

_____

(b) Explain the results obtained at

(i) 25°C. (2 marks)

_____

_____

_____

(ii) 36°C. (2 marks)

_____

_____

_____

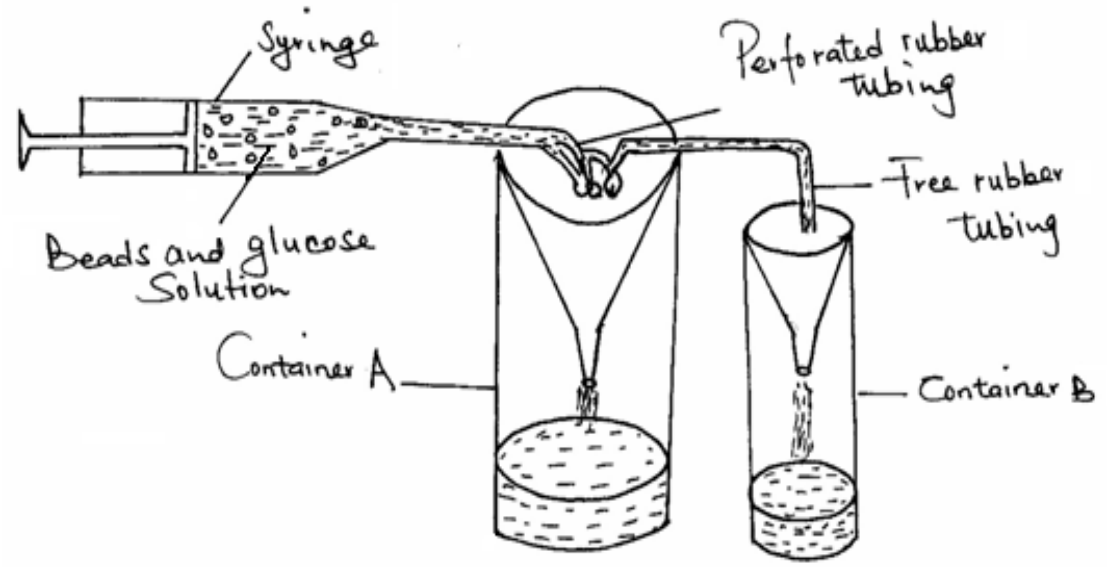
(c) (i) Other than temperature, state **one** external factor that affect the rate of photosynthesis. (1 mark)

_____

(ii) Suggest the product which could have been used in the experiment. (1 mark)

_____

3. The diagram below shows a model of the nephron of a mammalian kidney.



(a) Which parts of the nephron are represented by the:

(i) Syringe? (1 mark)

_____

(ii) Perforated rubber tubing? (1 mark)

_____

(iii) Free rubber tubing? (1 mark)

_____

(b) Name the type of filtration taking place within the perforated rubber tubing. (1 mark)

_____

(c) What would happen to the contents of the syringe if its handle was slowly pushed forward? Explain. (4 marks)

_____

_____

_____

_____

4. The table below shows the number of Leopards and Impala in a grassland park over a period of six years.

Time in years	1	2	3	4	5	6
Number of Impala	360	498	546	216	120	72
Number of Leopard	11	17	25	7	3	2

(a) (i) What is the average number of Impala in the park during the six years. (2 marks)

_____

_____

(ii) Account for the decrease in the number of leopards between the 4^{th} and 6^{th} year? (3 marks)

_____

_____

_____

_____

(b) Identify the trophic level occupied by

(i) Leopards (1 mark)

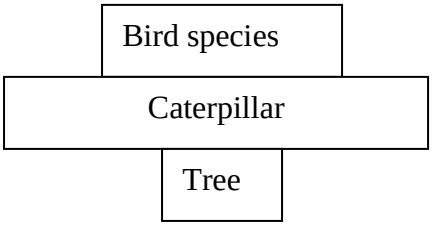
_____

(ii) Tick feeding on the leopard. (1 mark)

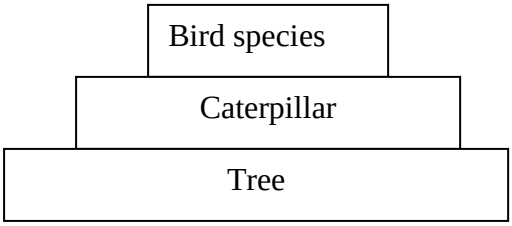
_____

(c) The **two** pyramids shown were obtained in the park.

I



II



(i) Identify each type of pyramid. (2 marks)

I: _____

II: _____

5. A pea plant with smooth seeds was crossed with one with wrinkled seeds. The gene for smooth seeds is dorminant over that for wrinkled seeds. Use letter R to represent the dorminant.

(a) State the genotype of the parents if the plant with smooth seeds was heterozygous. (2 marks)

_____

_____

(b) State the gametes produced by the smooth seeds and wrinkled seeds parents. (2 marks)

_____

_____

(c) State the genotype and phenotype of F1 generation. Show your working. (4 marks)

_____

_____

_____

_____

_____

SECTION B:(40 MARKS)

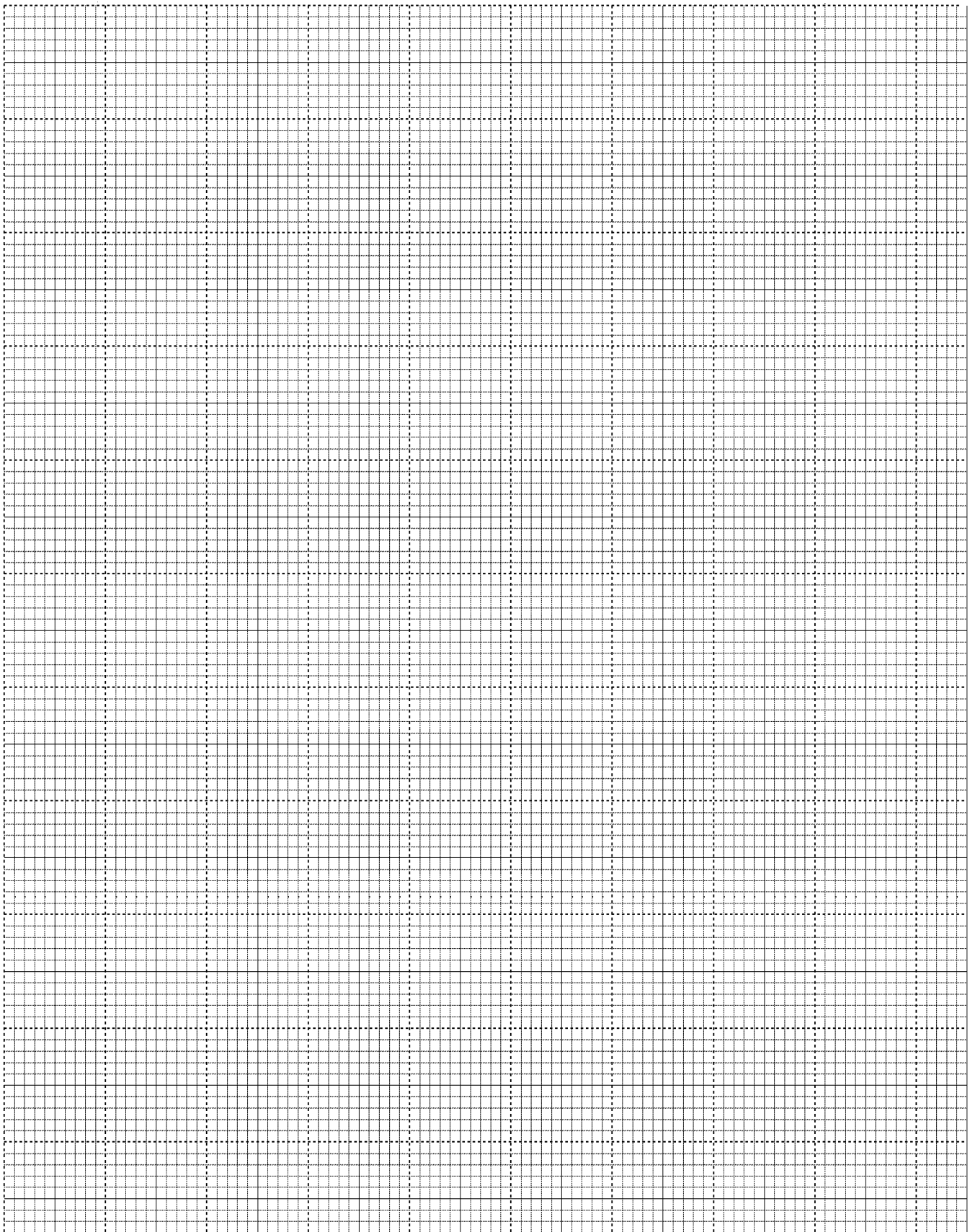
Answer question **6 (Compulsory)** and **EITHER** question **7** or **8** in the spaces provided after question **8**.

6. An experiment was carried out in which red blood cells were put in salt solutions of different concentrations. The table below shows the percentage of cells which were destroyed by haemolysis in different salt concentration.

Salt concentration (g/dm^3)	% of RBC destroyed By haemolysis
0	100
1	100
2	100
2.5	100
3.0	100
3.5	96
3.7	80

4.0	60
4.5	16
4.7	0
5.0	0
6.0	0

(a) Draw a graph of percentage of red blood cells haemolysed against salt concentration. (6 marks)



(b) Explain haemolysis of red blood cells. (3 marks)

_____

_____

_____

_____

(c) From the graph, state:

(i) the salt concentration at which 50% red blood cells were haemolysed. (1 mark)

_____

(ii) the highest salt concentration when the largest number of red blood cells were haemolysed. (1 mark)

_____

(d) (i) Suggest the normal salt concentration in the blood of the mammal from which the red blood cells were obtained. (2 marks)

_____

_____

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

_____

_____

_____

(iii) What term is used to describe the solution with equal solute concentration as that of the cells? (1 mark)

_____

(e) Name the process in the human body that ensures that haemolysis of red blood cells is prevented. (1 mark)

_____

(f) State the role of osmosis in organisms. (4 marks)

_____

_____

_____

_____

_____

_____

_____

_____

7. How are respiratory gases, oxygen and carbon (IV) oxide transported to and from tissues in mammals? (20 marks)

8. State and explain how the mammalian small intestines are adapted to perform their function. (20 marks)

_____

_____

_____

_____

_____

_____

_____

KIRINYAGA CENTRAL SUB-COUNTY

BIOLOGY
PAPER 3
(PRACTICAL)
TIME: 1¾ HOURS

1. You are provided with a specimen labelled H which is a piece of a mammalian intestine. Squeeze the contents in the lumen into a test tube. Add 3ml of water and shake the contents. Reserve the piece of intestine for question (b).

   (a) (i) Use the reagents provided to test for the presence of starch, proteins and reducing sugars in the contents. Record the procedures, observations and conclusions in the table below.

Food substance	Procedure	Observations	Conclusions
Starch			
Proteins			
Reducing sugars			

(9 marks)

(ii) Account for the results obtained in (a)(i) above. (3 marks)

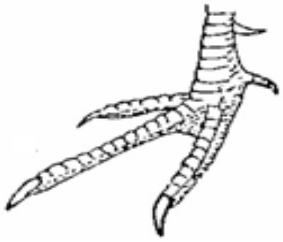
(b) Cut specimen H along its length to expose the inner surface.

(i) Feel the inner and outer surfaces of the specimen. Record your observations. (2 marks)

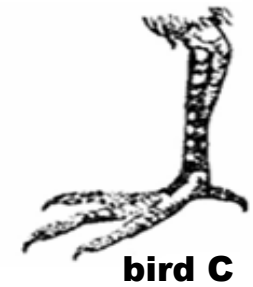
(ii) Account for our observations of the inner surface. (3 marks)

2. (a) The figure below shows feet of various birds. Study the diagram and answer the questions that follow.

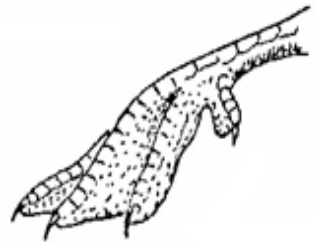
bird A



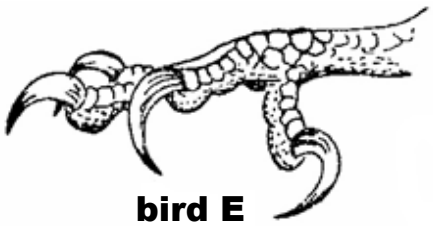
bird B



bird C



bird D



bird E

(i) Name the type of evolution represented by the diagrams. (1 mark)

(ii) Using Darwin's theory of evolution, explain how the feet of **bird E** would have evolved. (3 marks)

(iii) Explain how Larmack could have explained the evolution of feet of **bird C**. (3 marks)

(b) Figure 1 represents a bat wing, Figure 2 a whale paddle and Figure 3 an insect wing. Study the diagrams and answer the questions that follow.

Figure 1

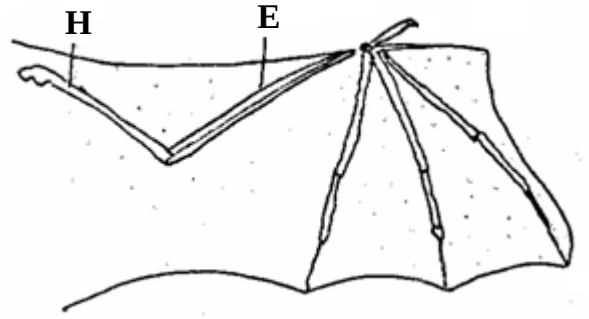


Figure 2

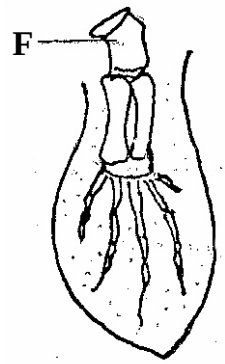


Figure 3

(i) Name parts labelled **E** and **F**. (2 marks)

(ii) State **one** difference between the wings in Figure **1** and **3**. (1 mark)

(iii) Name the type of joint found at proximal end of bone marked **H**. (1 mark)

3. (a) You are provided with a specimen labelled R. Using observable features only, identify the class to which the specimen belongs.

Class _____ (1 mark)

List the observable features used to identify the class which the specimen belongs. (3 marks)

(i) _____

(ii) _____

(iii) _____

(b) Stroke the specimen on the lateral side from the head end to the tail end. Repeat the stroking from the tail end to the head end.

(i) Record your observation. (2 marks)

(ii) Observe the arrangement of the scales. Record your observations. (1 mark)

(iii) State the significance of the arrangement of the scales. (1 mark)

(c) Name the observable features that adapt the specimen to:

(i) forward movement. (1 mark)

(ii) Balancing. (1 mark)

(iii) Staying upright. (1 mark)

(iv) Fast movement. (1 mark)