

THE KENYA NATIONAL EXAMINATIONS COUNCIL  
Kenya Certificate of Secondary Education

231/1

— **BIOLOGY** —

Paper 1



Nov. 2019 – 2 hours



Name ..... Index Number .....

Candidate's Signature ..... Date .....

**Instructions to candidates**

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) Answer **all** the questions in this question paper.
- (d) All answers must be written in the spaces provided.
- (e) **This paper consists of 11 printed pages.**
- (f) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- (g) **Candidates should answer the questions in English.**

**For Examiner's Use Only**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25								
														<b>Grand Total</b>		

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Turn over

Answer **all** the questions in the spaces provided.

1. Name the characteristic of living organisms illustrated by each of the activities described below:

(a) Dressing heavily (1 mark)

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(b) Bursting of the sporangium in the *Rhizopus sp* (1 mark)

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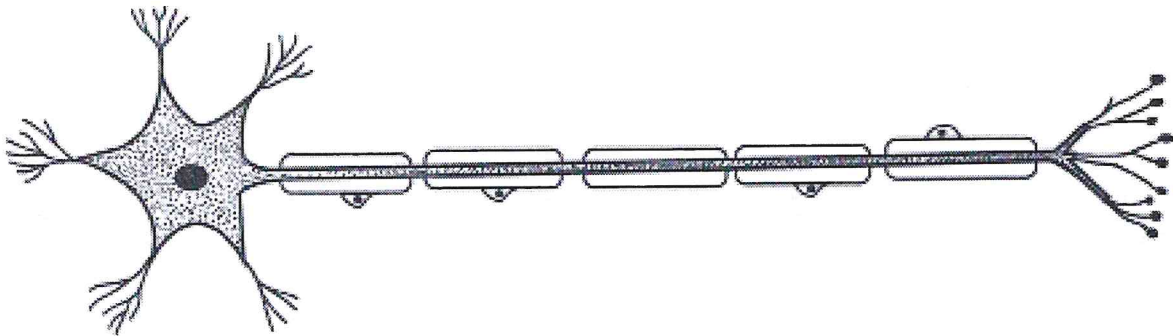
2. (a) Besides venation, state **two** other external characteristics of leaves that can be used to classify plants. (2 marks)

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(b) Explain why the bat is classified as a mammal yet it flies. (2 marks)

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3. The diagram below illustrates a specialised cell obtained from a certain tissue.



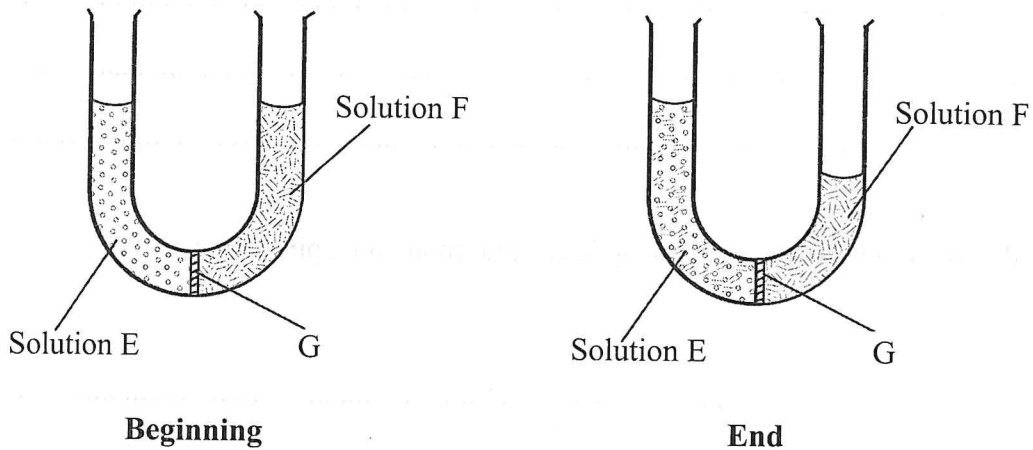
(a) Name the cell. (1 mark)

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(b) State **two** ways in which the cell is structurally adapted to its function. (2 marks)

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4. In investigating a certain physiological process, students set up the apparatus as shown below and made the observations after 30 minutes as illustrated.



(a) Name the physiological process being investigated. (1 mark)

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(b) Account for the observation made at the end of the experiment. (3 marks)

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(c) State the likely identity of G. (1 mark)

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5. Explain why significantly increasing the blood pH slows down the rate of selective reabsorption of materials in the kidney tubules. (3 marks)

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6. (a) Name the respiratory structure in the amoeba. (1 mark)

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(b) Give a reason for your answer in (a) above. (1 mark)

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7. Distinguish between chemical and mechanical digestion. (1 mark)

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8. State the role of each of the following in the mammalian respiratory system:

(a) mucus (2 marks)

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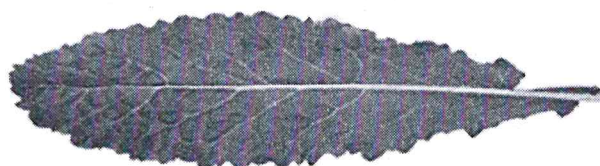
(b) cartilage rings (1 mark)

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(c) epiglottis (1 mark)

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9. Below is a photograph of *Brassica oleracea*, Sukuma wiki leaf.



(a) State **two** observable features that adapt the leaf to gaseous exchange. (2 marks)

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(b) Explain the relationship between photosynthesis and aerobic respiration within the leaf. (2 marks)

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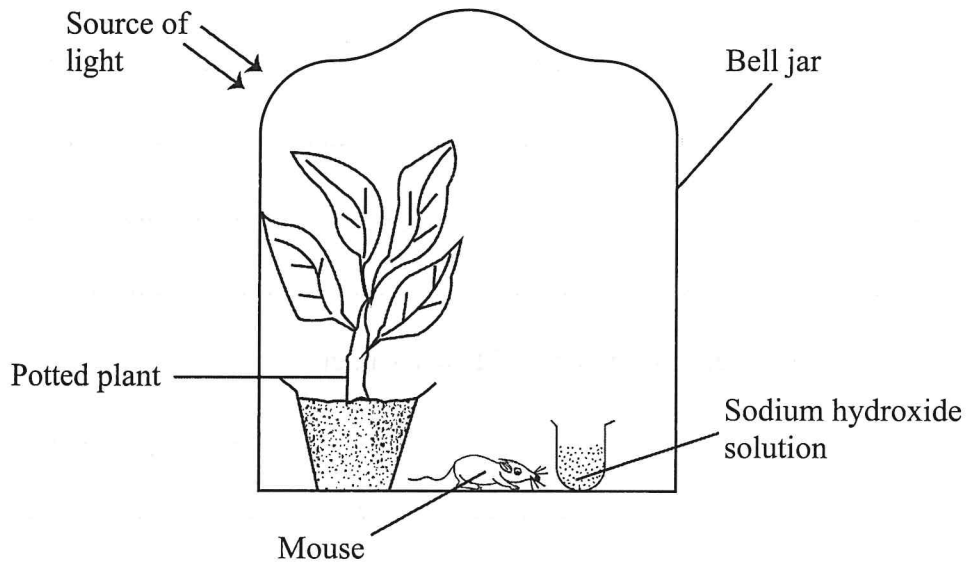
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10. In an investigation, students set up the apparatus below in the laboratory and made observations after 72 hours.



(a) Explain how inclusion of the following components would affect the mouse in the experiment:

(i) light (2 marks)

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(ii) sodium hydroxide solution (2 marks)

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(b) State why the students preferred to use a bell jar and **not** a tin box in the experiment. (1 mark)

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11. Explain each of the following physiological observations:

(a) sportsmen release little, concentrated urine at the end of a strenuous exercise (3 marks)

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(b) a rabbit has a higher oxygen demand than a camel (3 marks)

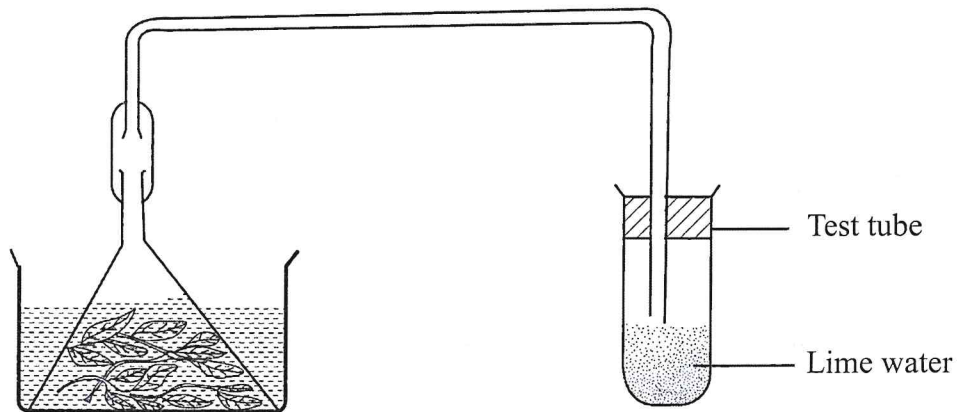
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12. While investigating a certain metabolic process in plants, students set up the apparatus as shown below in a classroom and monitored it for 48 hours.



(a) Identify the metabolic process under investigation. (1 mark)

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(b) Account for the observations made in the test tube at the end of the investigation. (2 marks)

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13. A female human being was found to have an extra sex chromosome in her cells.

(a) Give the total number of chromosomes in the female individual's cells. (1 mark)

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(b) Explain the possible cause of this condition. (2 marks)

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(c) State **two** physical characteristics observed in the female individual with such a condition. (2 marks)

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14. (a) Explain why fossil records as evidence of organic evolution are usually incomplete. (3 marks)

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(b) Name the evidence of organic evolution exhibited by occurrence of similar amino acid molecules in a range of organisms. (1 mark)

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15. (a) Distinguish between guttation and transpiration. (1 mark)

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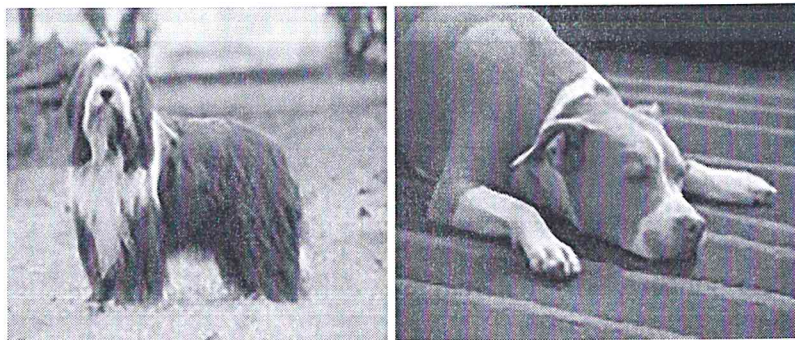
(b) State the significance of transpiration to a plant. (2 marks)

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16. State **two** benefits of mutation in living organisms. (2 marks)

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17. Below are photographs of two dogs.



Explain the possible reason for the difference in the length of their fur. (2 marks)

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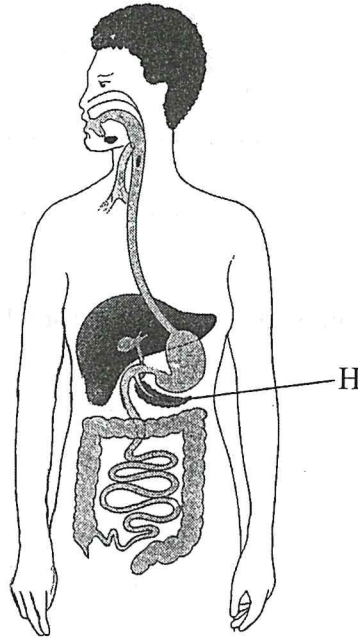




18. Name the type of tooth in carnivores mainly used for piercing and killing of preys. (1 mark)

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19. Below is a diagram of the human digestive system.



(a) Label with **Y** on the diagram where enzyme amylase is produced. (2 marks)

(b) Besides the digestive role, explain **one** other function of the part labelled **H**. (2 marks)

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20. State how each of the following features enhance efficient movement of fish in water:

(a) Scale (1 mark)

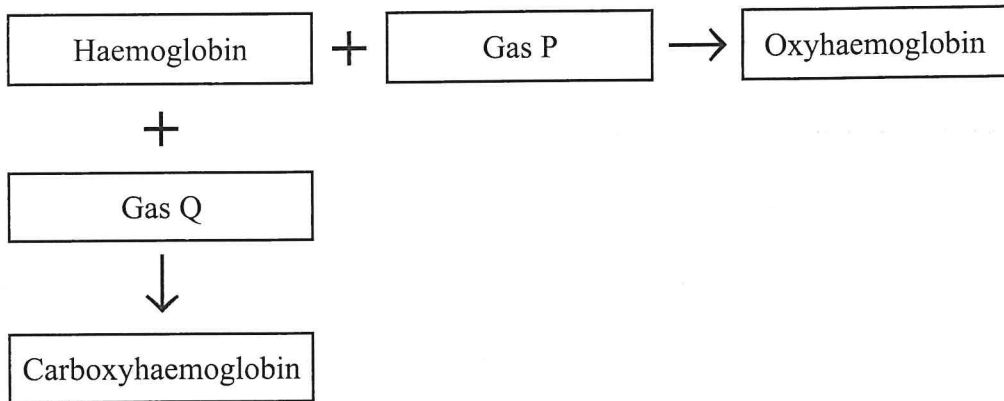
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(b) body shape (1 mark)

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21. Make a diagram of a simple, bilobed leaf with a serrated margin. (3 marks)

22. The chart below illustrates how respiratory gases are transported in the human blood.



(a) Identify gas Q. (1 mark)

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(b) Explain the advantage oxyhaemoglobin has over carboxyhaemoglobin. (2 marks)

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23. State **three** homeostatic roles of the liver. (3 marks)

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24. (a) *Plasmodium vivax* and *Plasmodium ovale* are transmitted by a mosquito. State with a reason whether the two organisms can interbreed. (2 marks)

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(b) Explain the evolutionary basis for the ever changing drugs for malaria treatment. (2 marks)

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25. State **one** characteristic of muscles responsible for each of the following:

(a) peristaltic movement (1 mark)

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(b) movement of limbs (1 mark)

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