

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education



231/1

BIOLOGY (Theory)

Nov. 2023 - 2 hours

Paper 1

Serial No.

21787917

Name: **Index Number:**

Candidate's signature: **Date:**

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** the questions in this question paper.
- All answers must be written in the spaces provided in the question paper.
- This paper consists of 11 printed pages.**
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- 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

Grand Total



Turn over

Answer all the questions in the spaces provided.



1. Name the disease caused by the following micro-organisms:

(a) *Entamoeba histolytica*; (1 mark)

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(b) *Plasmodium ovale*. (1 mark)

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2. (a) State **two** sites in animals where counter-current flow of fluids occurs. (2 marks)

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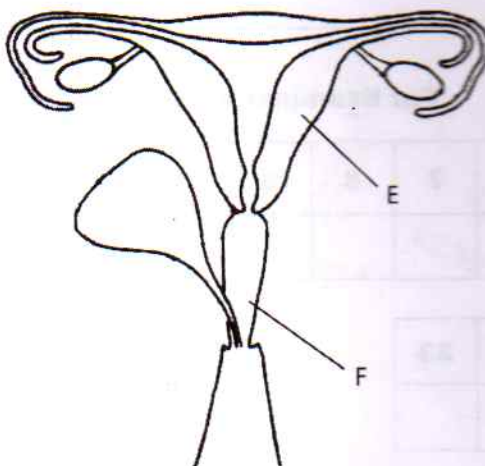
(b) Explain the significance of the counter-current flow system in living organisms. (2 marks)

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3. The following diagram represents parts of the female reproductive system.



(a) Identify the part labelled F. (1 mark)

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- (b) Explain the structural adaptation of the part labelled **E** to its function. (2 marks)

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- (c) Use letter **H** to label on the diagram the part where ectopic pregnancy is likely to occur. (1 mark)

4. The following diagram represents a skull of a certain mammal.



- (a) State the likely mode of nutrition for the animal from which the skull was obtained. (1 mark)

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- (b) Explain your answer in 4(a). (2 marks)

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5. Students observed that the smell from a decomposing animal carcass was stronger at mid-day than early in the morning.

- (a) Name the physiological process by which the smell reached the students. (1 mark)

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- (b) Account for the observation made by the students. (2 marks)

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6. State **two** ways in which sweating is significant to the human body. (2 marks)

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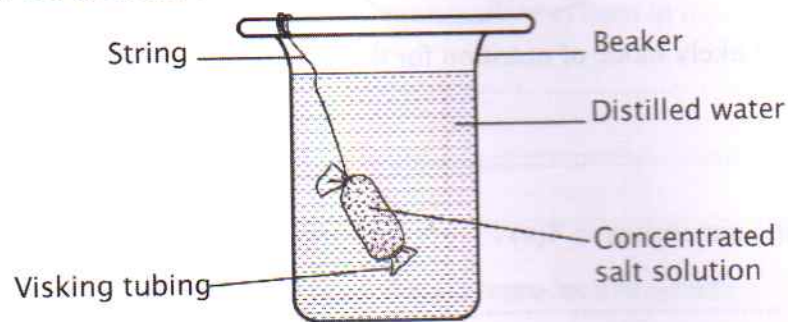
7. State **three** characteristics of the Kingdom Monera that are not found in the Kingdom Animalia. (3 marks)

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8. The following diagram illustrates a setup to investigate a certain physiological process. The setup was left undisturbed for 10 minutes.



- (a) Name the physiological process under investigation. (1 mark)

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- (b) State the observations made after 10 minutes. (2 marks)

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- (c) Account for the observation made in 8(b). (2 marks)

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9. In a genetics study, a pure breeding black bull was crossed with a pure breeding white heifer. All the offsprings were black.

(a) Account for the black colour phenotype in all the offsprings. (1 mark)



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(b) Work out the genotypic ratio of the offsprings if the pure breeding black bull was crossed with a female heterogeneous for colour. (5 marks)

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10. Account for the following observations:

(a) When the pancreatic duct of a mammal is blocked, blood sugar regulation remains normal while digestion is impaired. (2 marks)

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(b) Most desert animals have longer loops of henle. (3 marks)

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11. The following diagrams represent beaks of different birds.



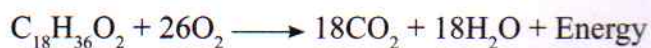
- (a) State the type of evolution illustrated by the diagrams. (1 mark)

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- (b) Explain the significance of the type of evolution stated in 11(a). (2 marks)

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12. The following equation represents a certain metabolic reaction taking place in animal cells.



- (a) Name the organelle where the reaction occurs. (1 mark)

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- (b) (i) Calculate the respiratory quotient of the substrate being oxidized. (2 marks)

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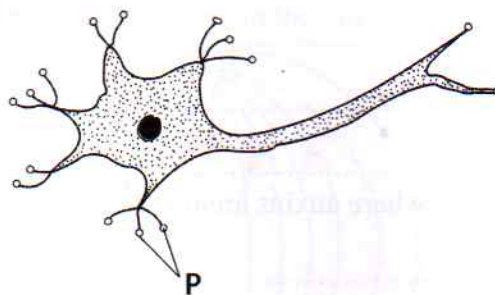
- (ii) Identify the substrate being oxidized in the reaction. (1 mark)

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- (c) State **two** factors other than oxygen concentration, that can affect the rate of the illustrated reaction. (2 marks)

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13. The following diagram illustrates a neurone.



(a) (i) Identify the neurone. (1 mark)

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(ii) Give a reason for your answer in 13a(i). (1 mark)

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(b) (i) Name the part labelled **P** on the diagram. (1 mark)

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(ii) State the function of the part named in 13b(i). (1 mark)

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14. In an experiment, students added some water to a beaker containing maize flour and yeast. The beaker was covered and left on the laboratory bench undisturbed for three days.

(a) State the aim of the experiment. (1 mark)

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(b) State **two** observations made by the students after the three days. (2 marks)

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15. (a) State **two** characteristics likely to be observed in a 25-year old male incapable of producing enough testosterone. (2 marks)

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- (b) Name **one** part in plants where auxins are produced. (1 mark)

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16. (a) Name the branch of Biology that deals with the study of insects. (1 mark)

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- (b) Name **one** piece of apparatus one would use to collect insects for study. (1 mark)

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17. (a) Distinguish between magnification and resolution as used in microscopy. (1 mark)

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- (b) State the significance of the following procedures during the preparation of temporary wet mounts of plant tissues:

- (i) staining; (1 mark)

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- (ii) making thin sections. (1 mark)

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18. (a) State **two** means through which plants eliminate excess water. (2 marks)

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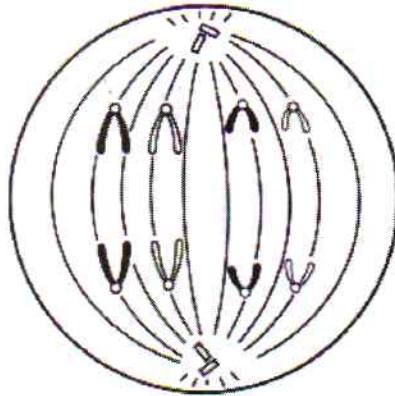
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- (b) Explain the significance of hair on the human skin during cold weather. (3 marks)

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19. The following diagram represents a stage in the mitotic division of a cell.



- (a) (i) Identify the stage of mitosis illustrated. (1 mark)

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- (ii) Give a reason for your answer in 19(a)(i). (1 mark)

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- (b) State the role of centrioles in cell division. (1 mark)

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20. State the significance of each of the following characteristics of living organisms:

- (a) irritability; (1 mark)

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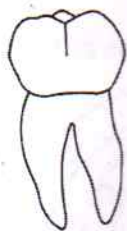
- (b) reproduction. (1 mark)

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21. The following diagram represents a mammalian tooth.



- (a) Explain the structural adaptation of the tooth to its function. (2 marks)

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- (b) How does drinking cold water immediately after a meal affect digestion? (2 marks)

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22. Explain the concept of natural selection among organisms in relation to an ecosystem with insufficient food. (2 marks)

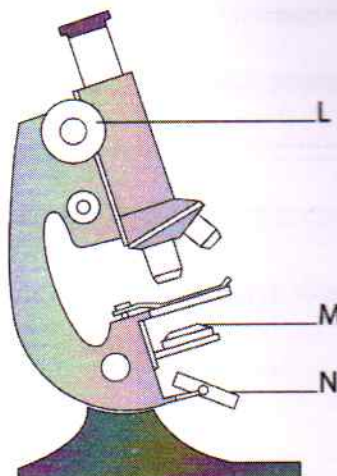
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23. The following diagram represents a light microscope:



- (a) Name the part labelled N. (1 mark)

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- (b) State the functions of the parts labelled L and M.

L (1 mark)

M (1 mark)

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