

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education

231/2

BIOLOGY
 (Theory)

Paper 2



Mar. 2022 - 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) This paper consists of **two** sections; **A** and **B**.
- (d) Answer **all** the questions in section **A** in the spaces provided.
- (e) In section **B** answer question **6** (**compulsory**) and either question **7** or **8** in the spaces provided after question 8.
- (f) **This paper consists of 12 printed pages.**
- (g) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- (h) **Candidates should answer the questions in English.**

For Examiner's Use Only

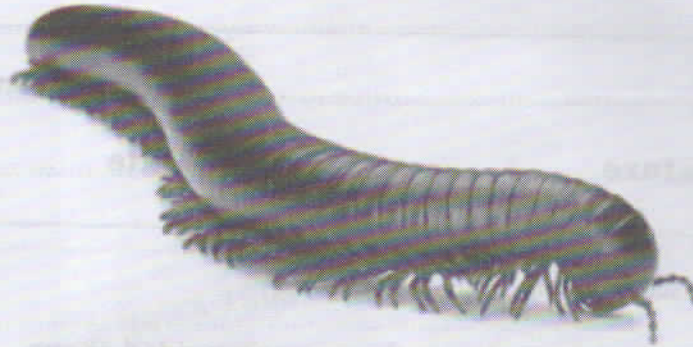
Section	Question	Maximum Score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
Total Score		80	



SECTION A (40 marks)

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

1. The photograph below shows an organism from a certain Class of organisms.



(a) (i) Name the Class to which the organism belongs. (1 mark)

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(ii) Using observable features from the photograph, state **two** reasons for your answer in 1(a)(i). (2 marks)

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(iii) State **two** ways in which the organism is important to the environment. (2 marks)

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(b) (i) Name the Kingdom to which bacteria belong. (1 mark)

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(ii) Name **two** bacterial diseases in human beings. (2 marks)

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2. (a) State **two** adaptations of the frog's skin to gaseous exchange. (2 marks)

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(b) Explain how the human nasal cavity is adapted to gaseous exchange. (3 marks)

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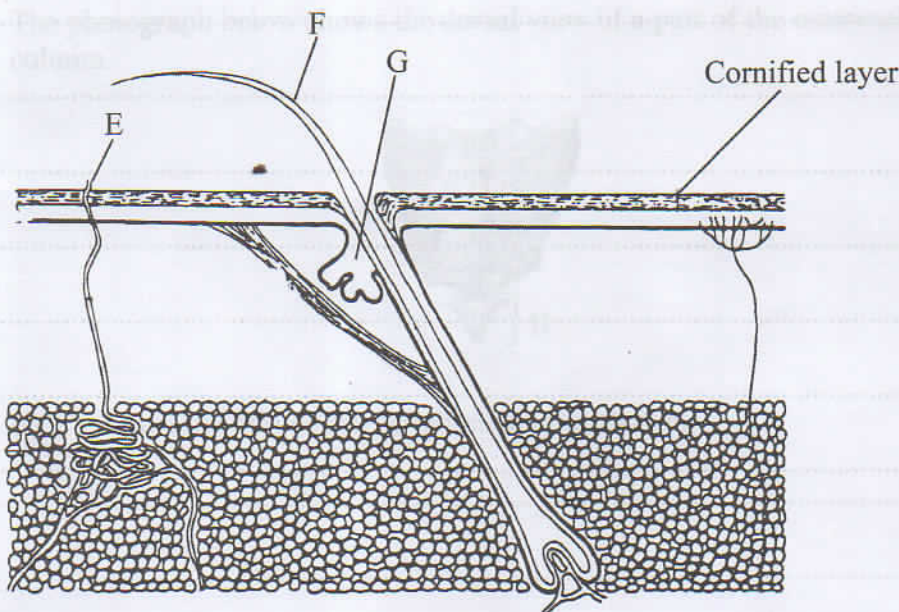
(c) Explain why the amoeba does **not** require an elaborate gaseous exchange system. (2 marks)

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(d) Name the respiratory disease caused by *Bordetella pertussis*. (1 mark)

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3. The diagram below shows a section through the mammalian skin.



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(a) (i) Name the substance produced by the part labelled G. (1 mark)

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(ii) State **two** functions of the substance named in 3(a)(i). (2 marks)

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(b) Name the part labelled E. (1 mark)

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(c) Explain the function of the part labelled F to the mammal. (2 marks)

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(c) (i) Name **one** part of the human body where the cornified layer is thickest. (1 mark)

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(ii) Give a reason for your answer in 3(c)(i). (1 mark)

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4. (a) Two dogs with black fur mated and produced an offspring with both black and brown fur. Given letter N represents the gene for black fur, determine the phenotypic ratio of the offspring. (5 marks)

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(b) The photographs below show a hairy pinna in a human ear.



(i) Explain why this trait is only found in males. (2 marks)

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(ii) Name **one** other trait that only appears in males. (1 mark)

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5. (a) State the role of sunlight in the formation of strong bones. (1 mark)

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(b) The photograph below shows the dorsal view of a part of the mammalian vertebral column.



(i) Name the part of the vertebral column shown. (1 mark)

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(ii) Name the part labelled **H**. (1 mark)

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(iii) State **three** ways in which the vertebra shown is adapted to its functions. (3 marks)

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(c) Explain the significance of movement in plants. (2 marks)

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The diagram below shows the lateral view of a part of the mammalian vertebral column. (4)



(1 mark) Name the part of the vertebral column shown. (1)

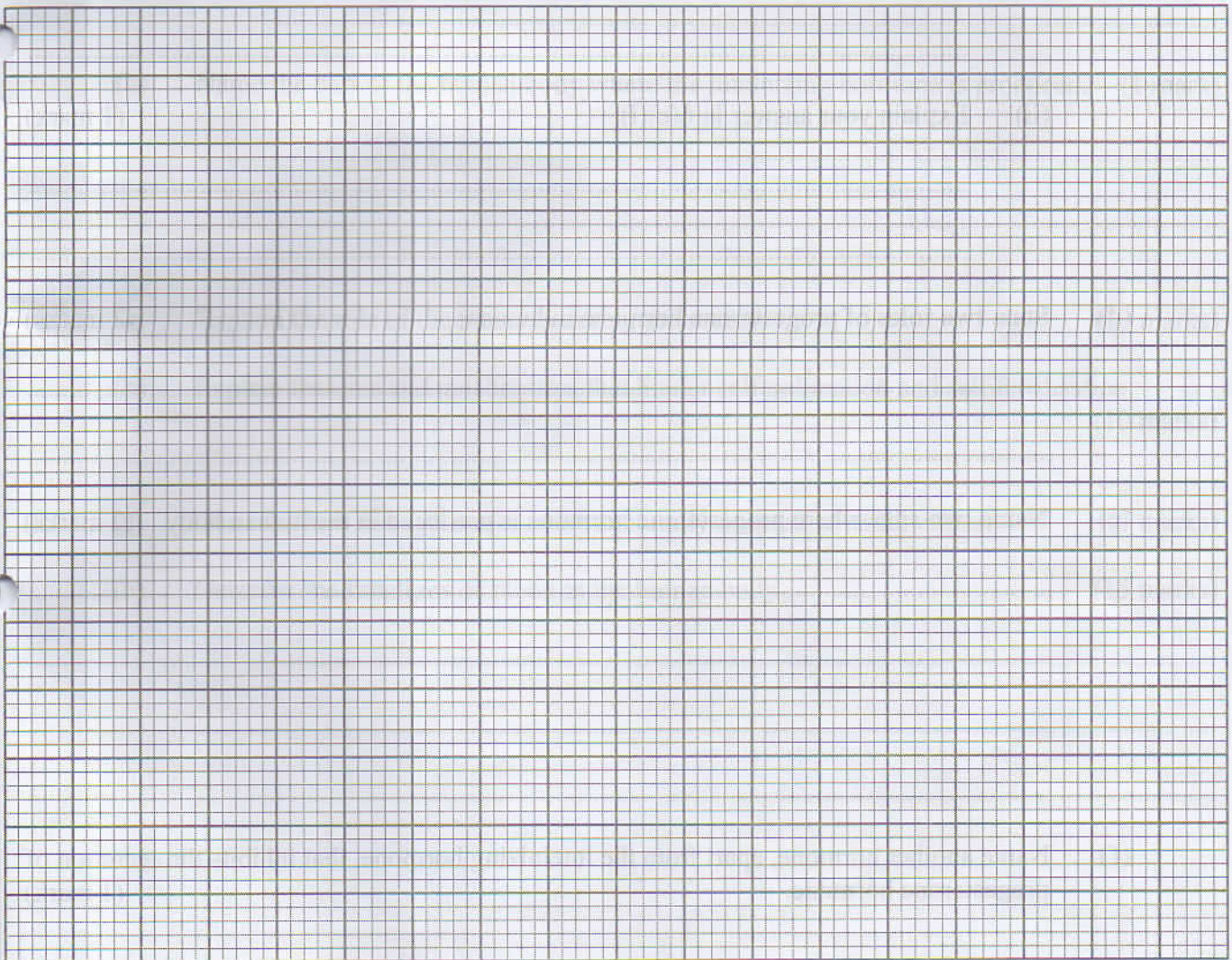
SECTION B (40 marks)

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

6. The table below shows the varying concentration of two hormones, progesterone and luteinizing hormone, determined at seven-day intervals during the human menstrual cycle.

Time in days	1	7	14	21	28
Concentration of progesterone (mg/cm^3 of blood)	2	2	24	100	20
Concentration of luteinizing hormone (mg/cm^3 of blood)	46	40	100	84	40

- (a) On the same axis, draw graphs of concentration of hormones against time. (8 marks)



(b) (i) Name the physiological process taking place when the concentration of luteinizing hormone is highest. (1 mark)

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(ii) State the significance of the process named in 6 (b) (i). (1 mark)

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(c) (i) Determine the concentration of progesterone hormone at which the endometrium is thickest. (1 mark)

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(ii) Explain your answer in 6(c)(i). (1 mark)

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(d) State **two** roles of progesterone hormone in humans. (2 marks)

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(e) Name **two** sites where progesterone hormone is produced in the human body. (2 marks)

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(f) Name another hormone, apart from the luteinizing hormone, that inhibits the secretion of progesterone hormone. (1 mark)

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(g) (i) Predict the concentration of progesterone hormone seen days after the study period if fertilisation did **not** take place. (1 mark)

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(ii) Give a reason for your answer in 6(g)(i). (1 mark)

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(h) Name the part of the human body where the luteinizing hormone is produced. (1 mark)

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7. (a) Explain the role of the placenta during pregnancy. (10 marks)

(b) Explain features and mechanisms that hinder self pollination and self fertilisation. (10 marks)

8. (a) Describe how the xylem tissue is structurally adapted to its functions. (5 marks)

(b) Describe the functions of blood in the human body. (15 marks)

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