NYAHOKAKIRA CLUSTER TWO 2024

Kenya Certificate of Secondary Education

231/2 BIOLOGY Paper 2

(Theory)

July 2024 – 2 hours

Name: …… Adm. No: ……..

Stream…….…… School……....

Instructions to Candidates

(a) Write your ***name, Admission number, stream and school*** in the spaces provided above.

(b) Answer **ALL** the questions in the spaces provided.

(c) Answer all questions in Section A.

(d) In section B answer question 6 (compulsory) and either question 7 or 8.

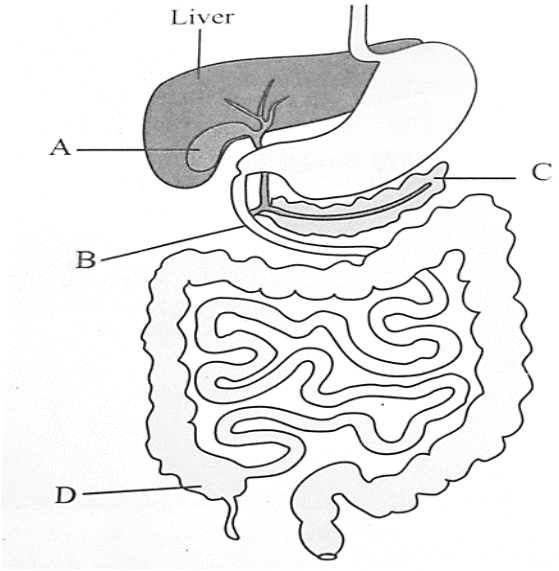
(e) ***This paper consists of 11 printed pages.***

(f) Students should check the question paper to ascertain that all the pages are printed as indicated 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	
	7/8	20	
	Total score	80	

1. The diagram below represents part of the human digestive system.



(a) Name the parts B and C. (2 marks)

B……

C……

(b) (i) Name the substance produced by the organ labeled A (1 mark)

…..……

(ii) State the function of the substance named (b) (i) above. (1 mark)

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(c) Explain the functional relationship between the organ labeled A and the liver. (1 mark)

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(d) The part labeled D is poorly developed in humans. Name the group of mammals in which it is well developed and describe its role

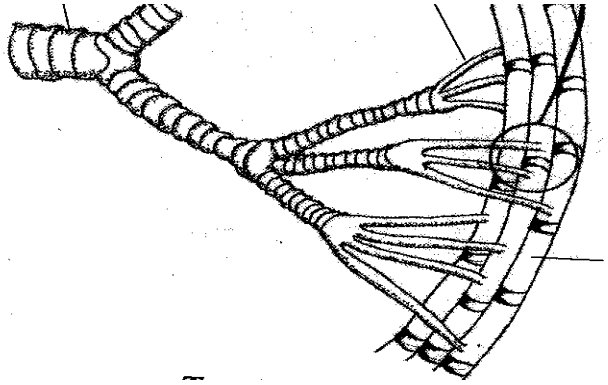
Group of organisms…….(1 mark)

Role……....(2 marks)

…..……

2. The diagram below represents part of a gaseous system in a grasshopper.

P Q



(a) Name the structures labeled P and Q

P……(1mark)

Q ……...(1mark)

(b) State the function of the structure labeled P (1 mark)

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(c) Describe the path taken by carbon (IV) oxide from the tissues of the insect the atmosphere (3 marks)

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(d) How is the structure labeled Q adapted to its functions (2 marks)

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3. In an experiment a set of pea seeds were germinated under controlled conditions of temperature. The rate at which carbon (IV) oxide gas was produced was then measured and recorded under the different temperatures as shown below.

Temperature	Volume of carbon (IV) oxide produced (cm^3)						
Time (hours)	0	1	2	3	4	5	6
30^oc	0.0	9.00	13.0	20.0	21.5	23.0	24.5
35^oc	0.0	8.00	16.0	25.0	25.5	26.5	27.0
40^oc	0.0	12.00	23,5	30.0	26.5	18.5	10.0

(a) What is the optimum temperature for the reaction in the above process (1 mark)

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Give reasons for your answer in (a) above (2 marks)

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(b) Account for the result obtained at 40^oc (4 marks)

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(c) Name two parameters used to determine the growth rate in a plant leaf (2 marks)

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4. Colour blindness is a disorder caused by gene mutation and its controlled by a recessive gene. A man with a normal eye colour vision is married a carrier woman

   (a) Using letter B to represent a normal colour vision, what is the chance that their son will be colour blind? Show your working (5 marks)

   (b) Name another trait in humans inherited in the same way as colour blindness (1 mark)

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   (c) State two causes of variation in living organisms (2 marks)

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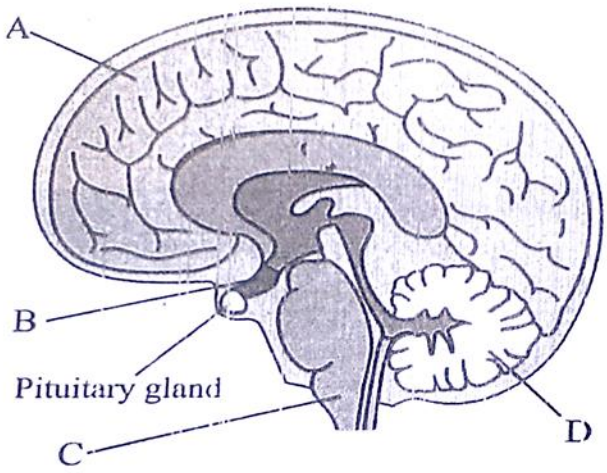
5. The diagram below shows a vertical section of the human brain.



(a) Name the parts labelled A and B. (2 marks)

A……

B……

(b) Damage to one of the labelled led to memory loss. State which part it was. (1 mark)

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(c) State one homeostatic role of the part labelled B. (1 mark)

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(d) State two functions of the part labelled D (2 marks)

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(e) How is the spinal cord protected? (2 marks)

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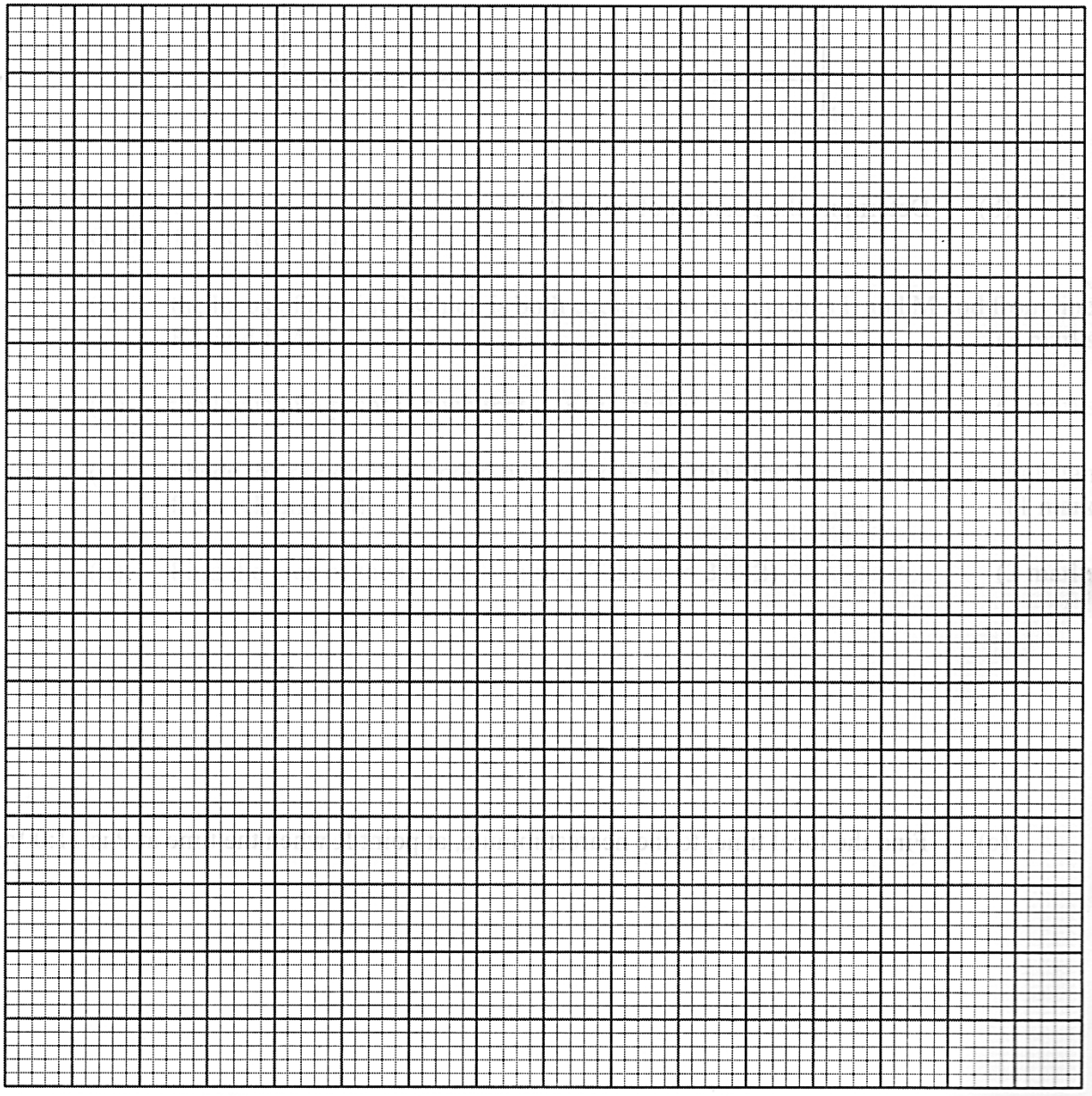
6. It was suspected that a pollution incident involving slurry had occurred in a local river. Oxygen content of the water in the river was measured, both upstream and downstream from the suspected slurry (raw sewage) leak. Samples were taken at seven points along the river and the results are shown in the graph below.

Distance along the stream (m)	0	20	40	60	80	100	120
Oxygen concentration (arbitrary units)	7.0	7.0	1.6	2.0	3.4	5.0	7.0

(a) Plot a graph of oxygen concentration against the distance along the stream (7 marks)



(a) From the graph determine:

(i) the distance along the stream where the slurry leak occurred. (1 mark)

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(ii)the least oxygen concentration and the distance when it occurred. (2 marks)

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(b) Account for the shape of the graph between:

(i) 20m – 40m along the stream. (3 marks)

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(ii) 60m – 120m along the stream. (3 marks)

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(c) Waterways can also be polluted by fertilizer run- off. The effects of fertilizer run-off and pollution by slurry are different in some ways. State and explain **one** of these differences. (2 marks)

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(d) state two causes of water pollution other than the above mentioned causes (2 marks)

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7. Describe how the mammalian heart is adapted to its function. (20 marks)

8. (a) State the adaptations of the cervical vertebrae (8 marks)

(b) Discus the role of the liver in blood sugar regulation (12 marks)

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