PROGRESSIVE BIOLOGY JOINT EXAMINATIONS

Kenya Certificate of Secondary Education

231/2- Paper 2 (THEORY)

BIOLOGY

JUNE - JULY. 2024 – 2 Hours

Name ……………………………………….Admission Number ………………….
School …………………… Date …………Candidate's Signature………………...

Instructions to candidates

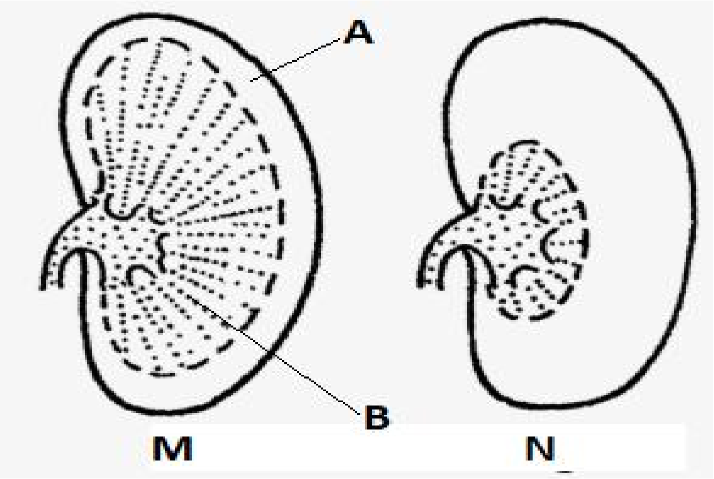
a) Write your name and admission number in the spaces provided above.
b) Write your school, the date of examination and sign in the spaces provided above.
c) This paper consists of **two** sections; **A** and **B**
d) Answer all the questions in section **A** in spaces provided
e) In section **B**, answer question **6** (**compulsory**) and either question **7** or **8** in the spaces provided after question **8.**
f) This paper consists of **10** 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 examiners 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	

Section A – 40 Marks. (Answer all questions in this section

1. The diagram below shows the longitudinal sections of kidneys from different animals.



a) i) Suggest the likely habitat of animal having kidney M and N. (2 marks)

M……………………………………………………………

N…………………………………………………………….

ii) Explain two observable reasons in each case for your answers in a) (i) above. (4 marks)

M…………………………………………………………………………………………………

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N…………………………………………………………………………………………………

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b) Name the part labelled. (2 marks)

A

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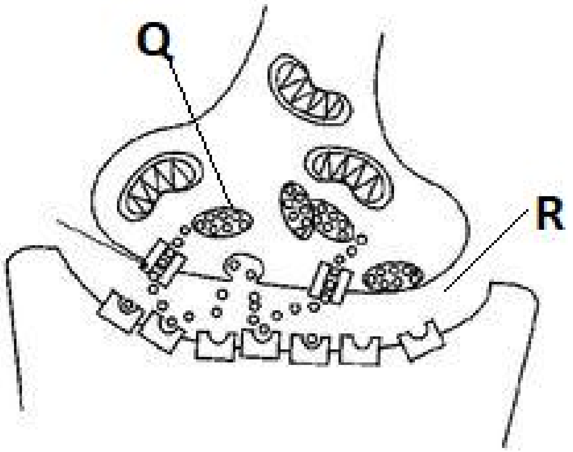
B ……………………………………………………………………………..……………………

2. Below is a diagram showing the synapse.



a) Name parts labelled (2marks)

Q ……………………………………………………

R ……………………………………………………

b) Identify the common neurotransmitter substance found at the synapse. (1mark)

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c) Identify **TWO** ions involved in the transmission of the nerve impulse along the axon. (2 marks)

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d) State **THREE** roles of cerebrospinal fluid in the spinal cord. (3marks)

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3. During an ecological study of a grassland ecosystem, a group of students recorded the following observations.

i. Grasshoppers feed on grass
ii. Guinea fowls feed on grasshoppers and termites
iii. Vultures feed on guinea fowls and leopards
iv. Leopards feed on gazelles
v. Termites feed on grass
vi. Gazelles feed on grass

(a) From this record of observations construct a food web. (4 marks)

(b) Write down, the food chains in which the guinea fowls are secondary consumers. (2 marks)

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(c) Name the organisms through which energy from the sun enters the food web. (1 mark)

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(d) Name the organism that has the least biomass in the food web. (1mark)

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4. a) What is meant by the term Sex-linked genes? (1mark)

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b) In *Drosophila melanogaster,* the inheritance of eye colour is sex-linked to the X chromosome. The gene for red eye is dominant. A cross was made between pure breed of red eyed female and a white eyed male. Work out the phenotypic ratio of F1 generation. (use R to represent the gene for red eye) (5marks)

c) State two importance genetic counselling in present day health facilities. (2marks)

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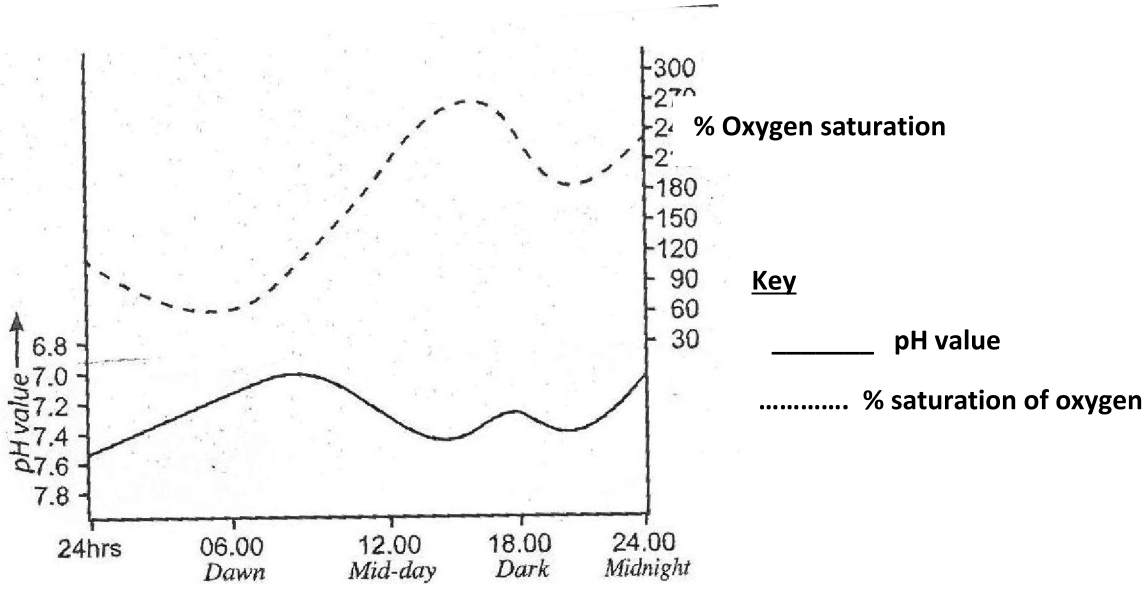
5. The graph below shows changes in pH and oxygen saturation in river water over a 24 hour period



a) When is the pH value and dissolved oxygen saturation % highest? (1 mark)

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(b) Account for the pH value recorded

(i) Between 08.00am and 1.00pm (3 marks)

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(c) Explain the influence of light intensity on % saturation of oxygen dissolved in this study between 6.00am to 3.00pm (4 marks)

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Section B – 40 marks

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

6. The table below shows how the stomatal aperture and the speed of wind can affect the rate of transpiration from the leaf of a plant. The stomatal aperture was measured in micrometers (µm)

Width of stomata in (µm)	Rate of transpiration in gm/m^2/hour	
	In still air	In wind
0	0.0	0.0
5	0.9	3.0
10	1.6	5.0
15	2.0	6.4
20	2.2	7.0

a) On the same axes plot a graph of rate of transpiration against width of the stomata. (8marks)

b) From the graph what is the rate of transpiration when the stomata aperture is 8µm? (2marka)

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c) Describe the relationship between the stomatal aperture and the rate if transpiration in still air. (3marks)

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d) Explain why the rate of transpiration in wind differs from rate in still air. (3marks)

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e) State the significance of transpiration to plants. (4marks)

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7. a) Outline the characteristics of meristematic tissues. (5marks)

b) Explain how different meristematic tissues contributor to growth of higher plants. (15marks)

8. a) State four roles of the livers (4marks)

b) Describe how the skin regulates body temperature in humans. (16marks)