NAME _____ ADM NO _____

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INDEX NUMBER: _____

231/2
BIOLOGY
Paper 2
Time: 2 HOURS
December 2021

BUNAMFAM CLUSTER EXAMINATIONS 2021

Kenya Certificate of Secondary Education

231/2

BIOLOGY

PAPER 2

Time: 2 HOURS

Instructions to Candidates

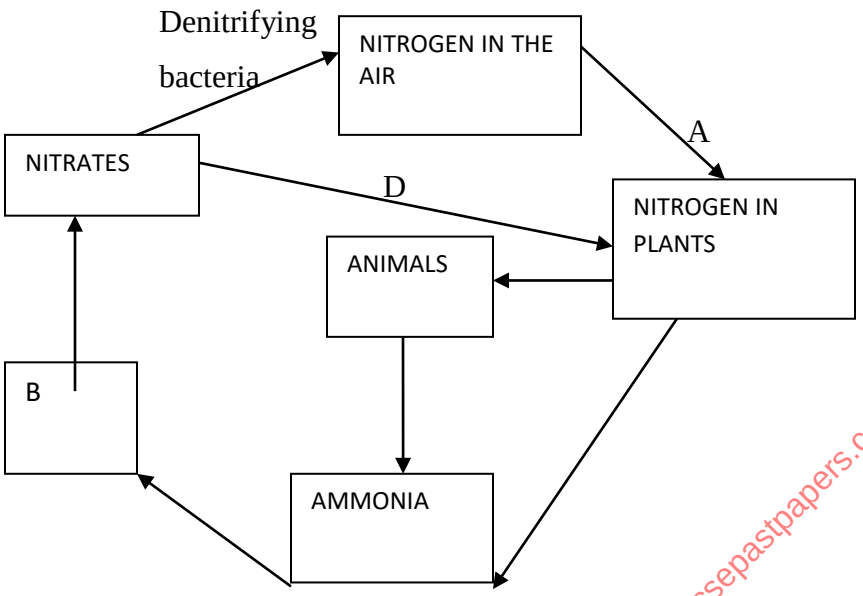
(a) This paper consists of **two sections; A** and **B**.
(b) Answer **all** the questions in **section A** in the spaces provided after each question.
(c) In **section B answer question 6 (compulsory)** and **either question 7 or 8** in the spaces provided after **question 8**.
(d) Candidates should answer the questions in English

For Examiner's Use Only

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE SCORE
A	1		
	2		
	3		
	4		
	5		
B	6		
	7		
	8		
TOTAL SCORE			

1. The diagram below represents the nitrogen cycle.

The diagram below represents the nitrogen cycle.



(i) Name the compound represented by B. (1mark)

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(ii) Name the group of organisms represented by **E**. (1mark)

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(iii) State the process labelled A and D. (2 marks)

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(iv) a) Name the part of the plant where nitrogen fixation takes place. (1mark)

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(b) What is the effect of denitrifying bacteria in the soil? (1mark)

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(v) How would excess pesticides in the soil interfere with Nitrogen fixation? (2 marks)

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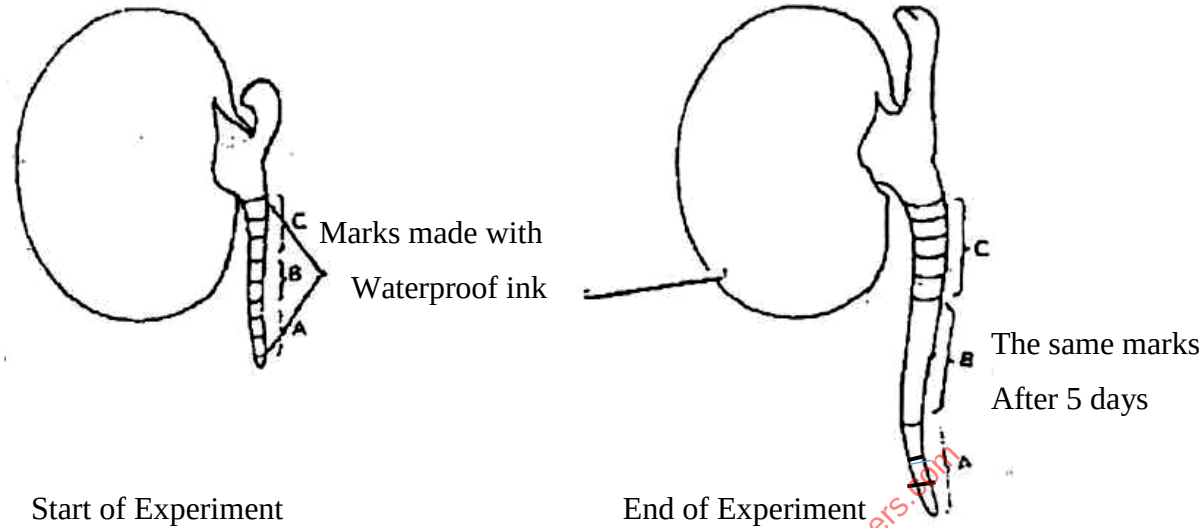
2. The diagram below shows the results obtained in an experiment on graph of a bean seedling.



Start of Experiment End of Experiment

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

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b) State the processes that occur in each of the regions marked A, B and C. (3 marks)

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c) Account for the observations made in the regions A and C. (4 marks)

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3. a) What is meant by the term linked genes? (1 mark)

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b) Haemophilia is a genetic condition transmitted through a recessive gene linked to **X** chromosome. The normal gene may be represented by $\mathbf{X^H}$.

i) What is the genotype of a haemophilic female? (1 mark)

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ii) A woman who is a carrier for the haemophilia gene marries a normal man. Work out the phenotypic ratio for their offspring. (4 marks)

iii) Haemophilia is more common in males than in females. Explain this phenomenon. (2 marks)

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4. A climbing plant twines around the stem of a tall tree.

(a) (i) Name the type of response exhibited by the climbing stem. (1 mark)

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(ii) Explain how the response named in (a) (i) above takes place. (3 marks)

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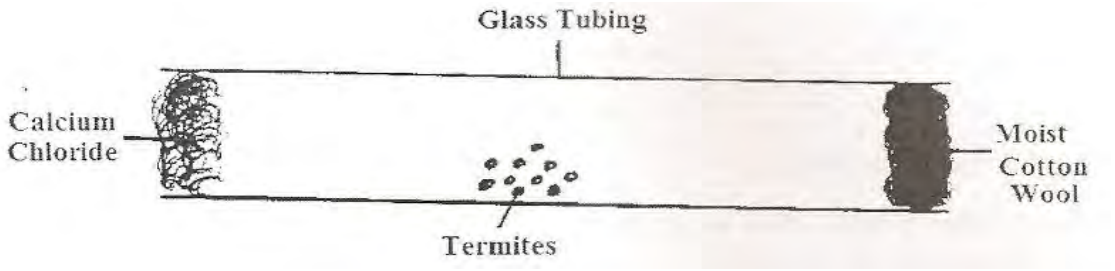
(b) An experiment was carried out to investigate the response of white termites to a certain stimulus. Ten termites were placed at the centre of glass tubing. Calcium chloride was placed one end of the tubing and moist cotton wool at the other end as illustrated below.



(i) What observations are made after 20 minutes? (1 mark)

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(ii) What type of response is exhibited by the termites? (1 mark)

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(iii) What is the survival value of the above response? (1 mark)

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(iv) What is Photonasty? (1 mark)

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5. A group of students set up the following experiments to investigate the factors that affect enzymes.

Tube 1	Tube 2	Tube 3	Tube 4
Egg white Amylase/ptyalin at 30° C	Boiled starch Dilute acid Amylase 36^{0}C	Boiled starch Amylase	Boiled starch Boiled Amylase

a) Identify the property of enzymes being investigated in tubes 1 and 2 (2 marks)

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b) After 3 hours thee students tested the content in the four tubes for starch. They obtained the following results in tube 2, 3 and 4.

Tube 2 – Blue – black colour

Tube 3 – Brown colour of iodine remained

Tube 4 – Blues black colour.

Account for the results obtained in tube 3 and 4. (2 marks)

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c) What results would you expect in tube 3 if temperature was maintained at 5^{o}C? Give a reason for your answer. (2 marks)

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d) Name **two** enzymes found in the pancreatic juice (3 marks)

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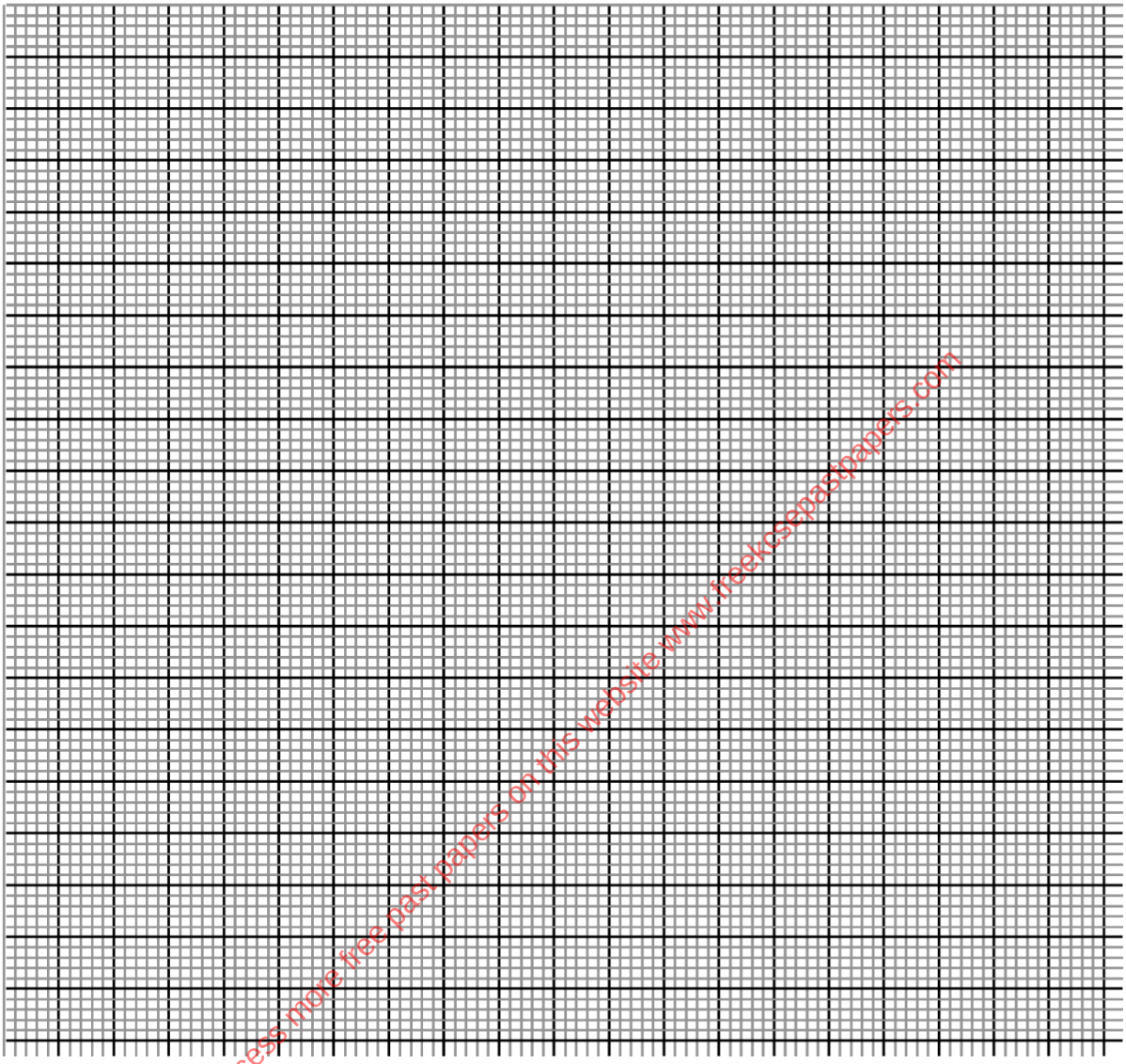
SECTION B (40marks)

Answer question **6(compulsory)** and **either question 7 or 8**

6. The table below contains information on changes that occur in a river, downstream from a sewageoutflow.

Distance downstream from point of sewage entry(m)	Concentration of dissolved oxygen (%)	Number of organisms (arbitrary units)		
		Bacteria	Algae	Fish
0	95	88	20	20
100	30	78	8	6
200	20	74	6	2
300	28	60	20	0
400	42	50	40	0
500	58	48	70	0
600	70	44	84	0
700	80	42	90	0
800	89	38	84	0
900	95	36	68	4
1000	100	34	54	20

a) Plot a graph of number of organisms against distance downstream. (7 marks)



b) Describe the changes in the concentration of oxygen dissolved in the water downstream fromthe point of sewage entry. (2 marks)

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c) Account for the changes in the numbers of each of the following organisms downstream.

i. Bacteria (3 marks)

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ii. Algae (3marks)

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iii. Fish (3marks)

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State **two** ways in which the degree of water pollution caused by sewage can be reduced. (2marks)

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7. a) Explain **three** reasons why plants lacks well developed excretory organs. (3 marks)

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b) Name **three** ways in which plants excrete waste products. (3 marks)

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c) State and explain the economic importance of plants excretory products. (14 marks)

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8 Describe how the various parts of the human digestive system are adapted to their functions. (20 marks)

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