Name ..... 001014178 Index Number ..... / .....

231/2
BIOLOGY
Paper 2 (THEORY)
Oct./Nov. 2014
2 hours

Candidate's Signature .....

Date .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL

Kenya Certificate of Secondary Education

BIOLOGY

Paper 2 (THEORY)

2 hours

Instructions to candidates

(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of the 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** the questions in this section in the spaces provided.*

1 (a) State **four** characteristics of fruits dispersed by animals. (4 marks)

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(b) State **two** roles of each of the following hormones in menstruation:

(i) luteinising hormone; (2 marks)

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(ii) oestrogen. (2 marks)

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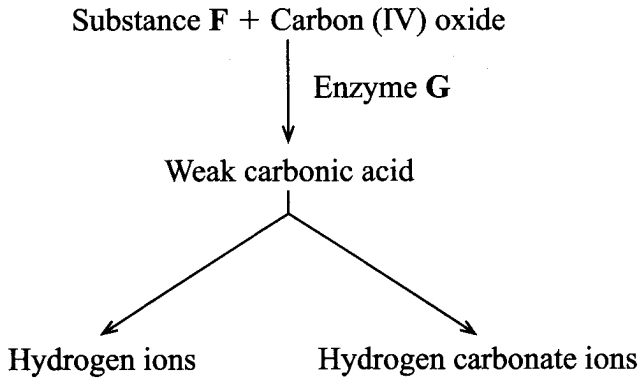
2 The diagram below illustrates the role played by red blood cells in the transportation of carbon (IV) oxide.



(a) Other than the carbon (IV) oxide transportation in the red blood cells, name the other form of carbon (IV) oxide transportation in humans. (1 mark)

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(b) (i) Name substance **F** ..... (1 mark)

(ii) Name the enzyme marked **G** and state its role in the reaction. (2 marks)

Enzyme .....

Role .....

(c) Explain why transportation of carbon (IV) oxide in red blood cells is advantageous. (2 marks)

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(d) Explain the role of calcium ions in blood clotting. (2 marks)

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3 (a) Describe the mechanism of gaseous exchange in plants through the lenticels. (3 marks)

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(b) Explain each of the following:

(i) the tracheoles lack spiral bands of chitin; (3 marks)

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(ii) the floor of the mouth is lowered during inhalation in a bony fish. (2 marks)

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4 (a) How is sex determined in man? (4 marks)

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(b) (i) Differentiate between sickle cell anaemia and sickle cell trait. (2 marks)

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(ii) Explain why people with sickle cell trait have an adaptive survival advantage over normal individuals in malaria endemic regions. (2 marks)

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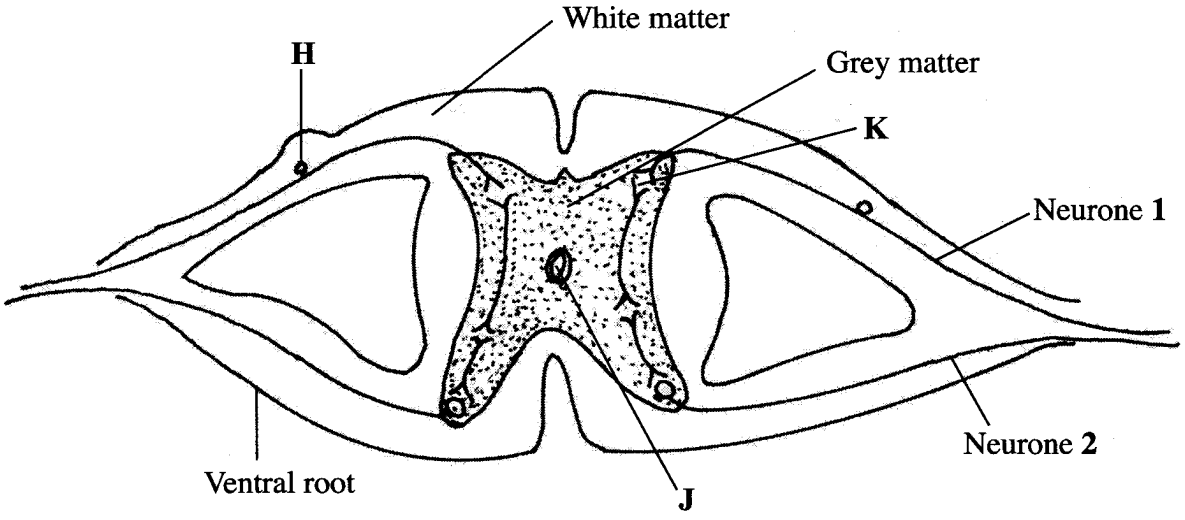
5 The diagram below represents the transverse section of the spinal cord.



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

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(b) State **two** functions of the fluid found in the part labelled **J**. (2 marks)

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(c) Give a reason for the colour of white matter. (1 mark)

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(d) Name and give the function of the enzyme found at the part labelled **K**.

Name ..... (1 mark)

Function .....

..... (2 marks)

(e) On the diagram, use an arrow to show the direction of impulse transmission along the neurone labelled **1**. (1 mark)

SECTION B (40 marks)

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

6 An experiment was done to determine the uptake of nitrogen from the soil by broad bean seedlings. The experiment was done with one set of seedlings **M** grown in the atmosphere enriched with carbon (IV) oxide and another set up of seedlings **N** grown in the normal atmosphere.

The amount of nitrogen in each seedling was measured in milligrams at intervals of ten days. The table below shows the results obtained.

	Amount of Nitrogen in Milligrams									
SET M	0	25	70	125	160	395	635	860	895	915
SET N	0	15	35	50	65	105	120	125	135	140
TIME (DAYS)	15	25	35	45	55	65	75	85	95	105

(a) Using the same axis draw line graphs of nitrogen uptake by the two (**M** and **N**) sets of broad bean seedlings against time. (8 marks)

(b) Determine the rate of uptake of nitrogen in Set **M** between 65 and 85 days. (2 marks)

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(c) (i) What is the relationship between carbon (IV) oxide concentration in the air and nitrogen uptake? (1 mark)

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(ii) Account for the relationship in (c)(i) above. (3 marks)

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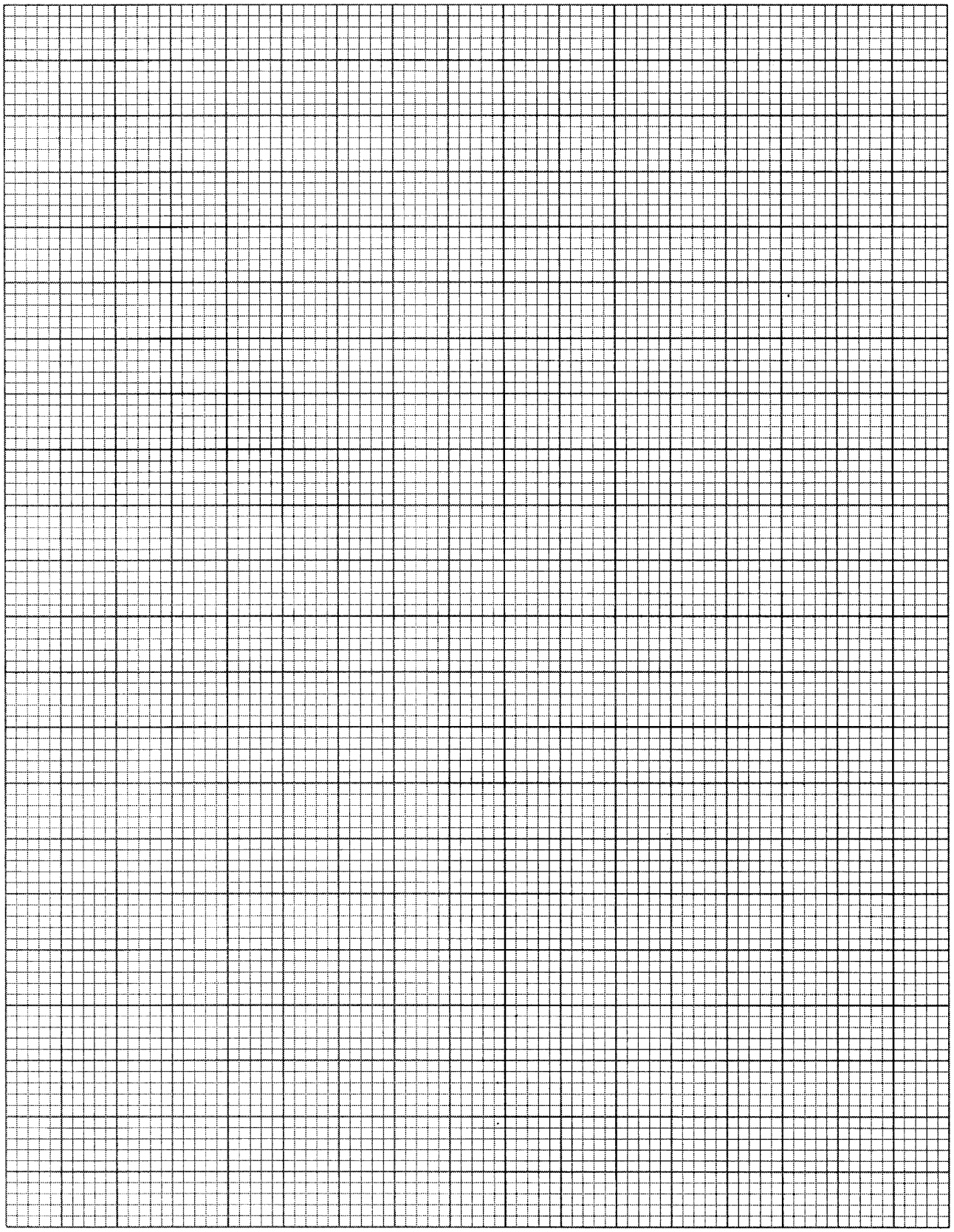

(d) (i) What would happen to the concentration of nitrogen in the seedlings in set **M**, if after 75 days the seedlings are transferred to a normal atmosphere. (1 mark)

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(ii) Explain your answer in (d)(i) above. (2 marks)

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(e) State **three** ways in which nitrogen fixation occurs. (3 marks)

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7 (a) Explain how each of the following factors affects the rate of photosynthesis:

(i) temperature; (2 marks)

(ii) chlorophyll concentration. (2 marks)

(b) Describe the process of carbohydrate digestion in human beings. (16 marks)

8 (a) How does excretion take place in plants? (4 marks)

(b) Describe the role of the human skin in homeostasis. (16 marks)

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