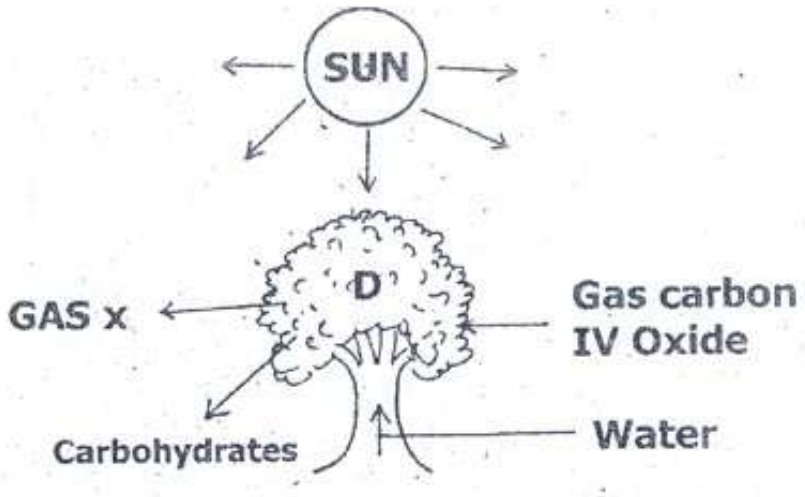
FORM FOUR CLUSTER KCSE MODEL9

BIOLOGY PAPER 2 QUESTIONS

SECTION A (40 Marks)

Answer all the questions

1. The diagram below illustrates the first stage in the energy flow in the ecosystem.



a) Identify i) Organelle responsible for activity in D.

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ii) Gas x

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b) Suggest the roles played by each of the following in the processes illustrated above.

i) Light energy

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ii) Water

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iii) Carbon (II) oxide

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c) Give three ways in which the carbohydrates produced in the organelles at D is utilized in plants.

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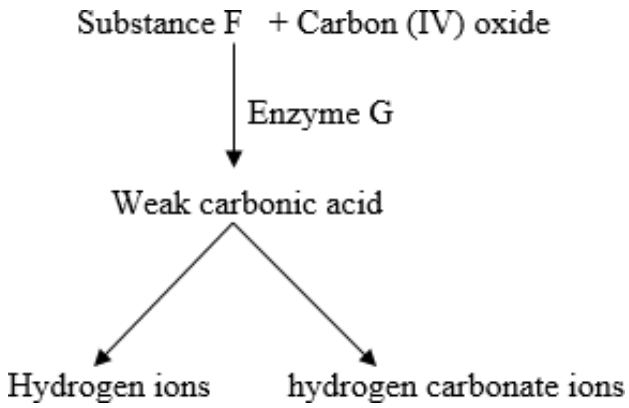
2. The diagram below illustrates the role played by red blood cells in the transportation of carbon (IV) oxide.



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

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b) Name substance F.

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Name enzyme marked G and state its role in the reaction.

Enzyme ……

Role ……

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

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

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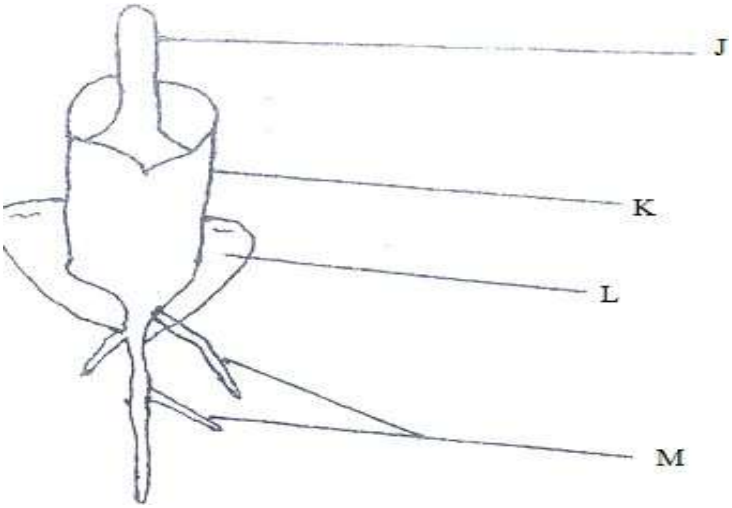
3. The diagram below shows the germinating maize fruit.



a) i) Name the parts labelled J and L on the diagram.

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ii) What type of germination this shown in this maize fruit?

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iii) Identify the parts labelled K and M state their functions.

Structure	Identity	Function
K		
M		

b) State one role of Ethylene Hormone in plants.

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4. In an investigation, a variety of pea plants grown from seeds with smooth coats crossed with plants grown from seeds with wrinkled coats. All the seeds obtained in the First Filial (F1) generation had smooth seed coats. a) Using the letter R to represent the gene for smooth seed coat, work out the genotype of the F1 generation. Show your working.

   b) If the F1 generation was selfed, determine the phenotypic ratio of the Second Filial (F2) generation. Show your working. .....

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   c) If the total number of seeds in the F2 generation was 14640, calculate the number of seeds with wrinkled coats. Show your working.

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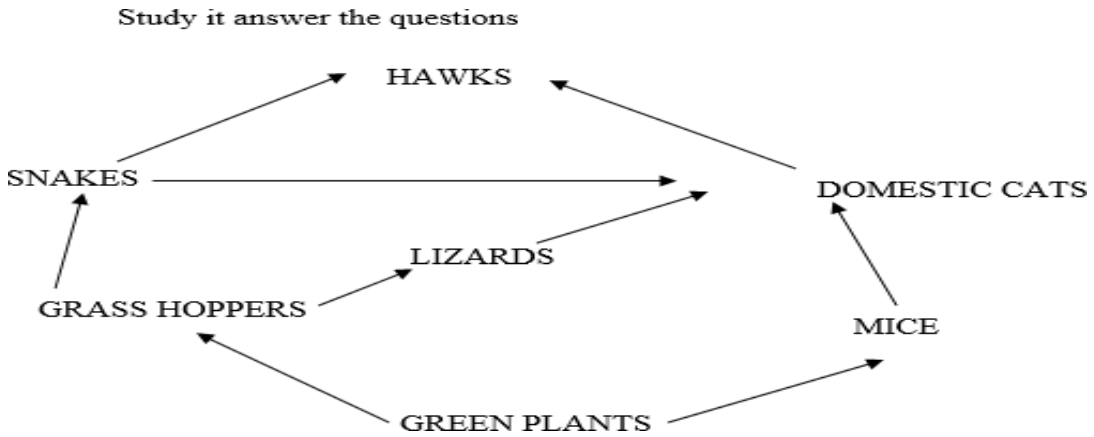
5. The chart below shows a feeding relationship in a certain ecosystem.



   a

   i) Identify this feeding relationship.
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   ii) Name the producers in this ecosystem.
   .....

iii) Which organisms have the highest varieties of predators.

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b) Construct two food chains from this ecosystem ending with a tertiary consumer.

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c) Identify three phyla that the consumers in this ecosystem belong to.

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SECTION B (40 Marks)

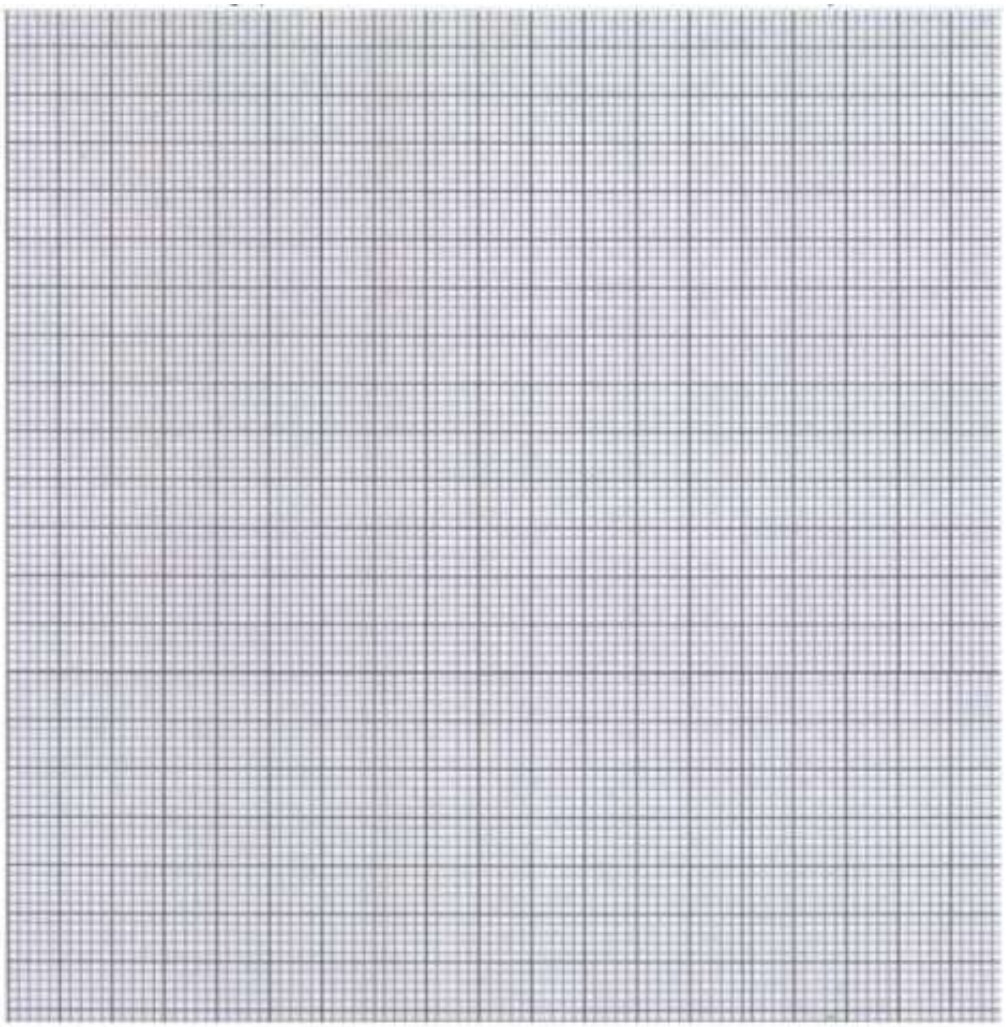
Answer question 6 (compulsory and either question 7 or 8

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 milligram 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 on the graph paper.



b) Determine the rate of uptake of nitrogen in set M between 65 and 85 days.
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c) i) What is the relationship between carbon (IV) oxide concentration in the air and nitrogen uptake? ……
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ii) Account for the relation in (c) (1) above.

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d) i) What would happen to the concentration of nitrogen in the seedling in set M, if after 75 days the seedlings are transferred to a normal atmosphere?

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

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e) State three ways in which nitrogen fixation occurs.

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

   i) Temperature

   ii) Chlorophyll concentration.

   b) Describe the process of carbohydrates digestion in human beings.

8. a) Describe the meaning of the following phrases as explained in the mechanism of Evolution:

   (i) “Struggle for existence”.

   (ii) “Survival for the fittest”.

   b) Describe how comparative Anatomy explains the evidence for organic evolution.