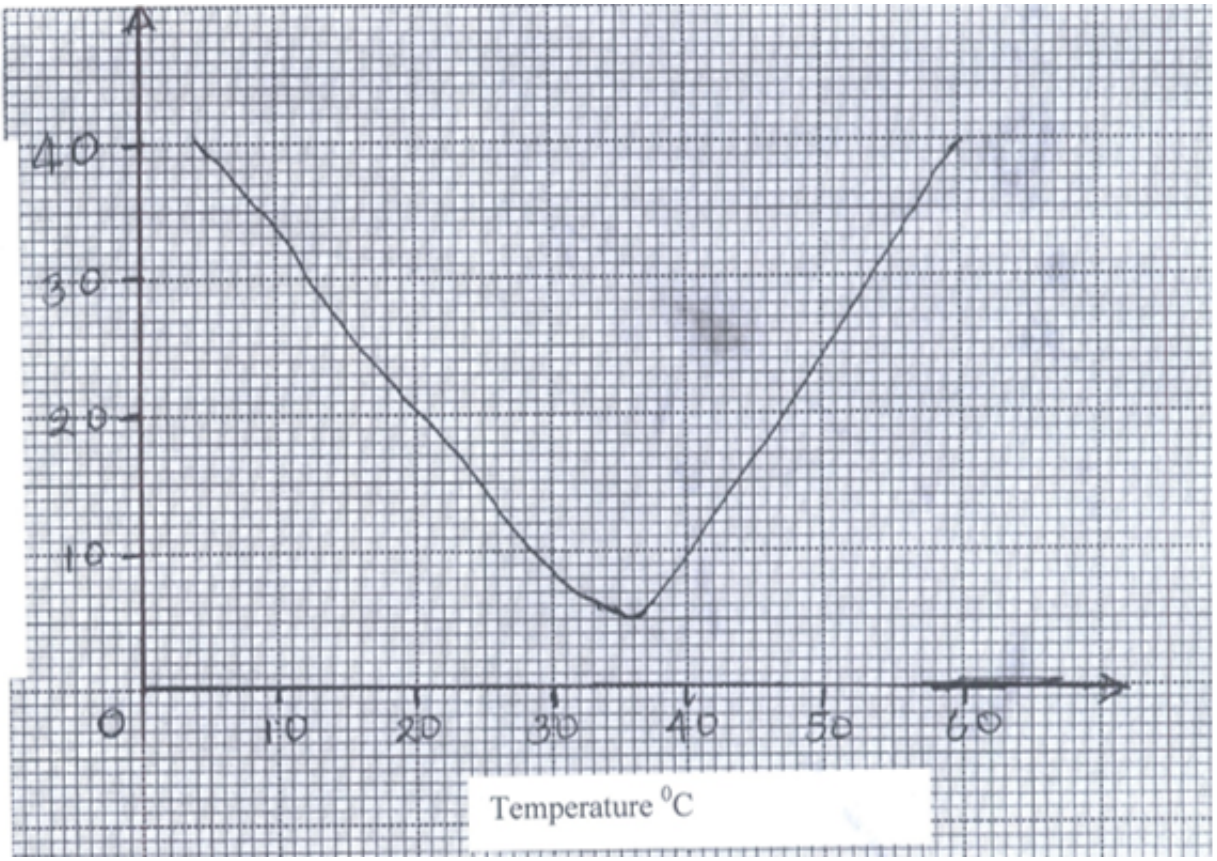
SECTION A (40 Marks)

Answer ALL questions in this section in the spaces provided

1. a) Define the term Denature as used with enzymes.

   b) In an experiment to investigate the action of pepsin on egg albumen, equal amount of pepsin were added to amounts of egg albumen test-tubes. The test tubes were placed in water baths at different temperatures.

   The graph below shows time taken for the enzyme to digest protein in each.



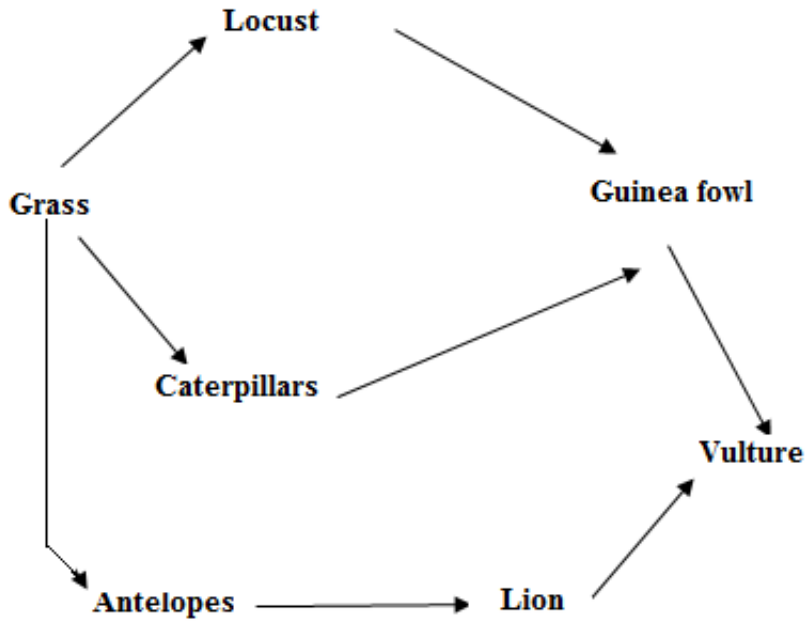
   i) What is the optimum temperature for the enzyme?

   ii) Account for the time taken to digest egg albumen at 450C.
   c) i) In which form is the enzyme pepsin secreted.

   ii) Give a reason for your answer in c (i) above.

   d) Name two plant tissues which lack chloroplast. (2marks)

2. Study the food web below representing a certain ecosystem and use it to answer the questions that follow



a) Distinguish between a food chain and food web.

b) With a reason name the organisms that would have the largest biomass. Organism

Reason

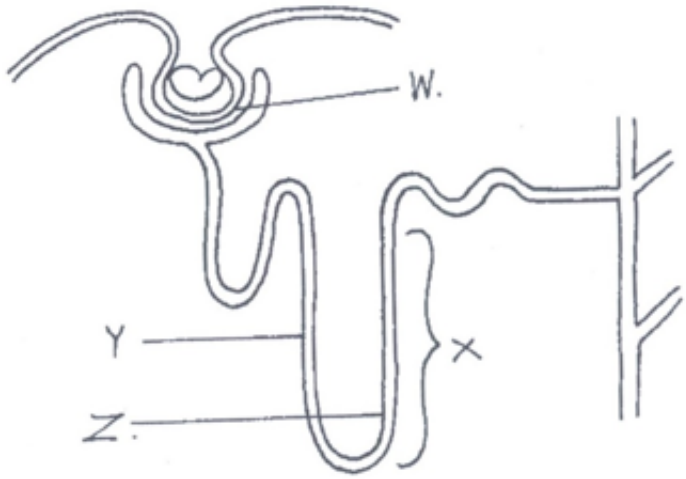
c) Write down a food chain in which the vultures are tertiary consumers.

d) What would be the effect of introducing gazelles and termites into the ecosystem?

e) State the trophic level occupied by the lion in the food web.

f) What would be the role of bacteria in this ecosystem?

3. The diagram below represent a nephron from a human kidney.



a) Name the part labeled X.

b) Sodium chloride is actively pumped out of the part labeled Z into the medulla of the kidney. This sodium chloride moves back into part Y. Explain the effect of the sodium chloride concentration in

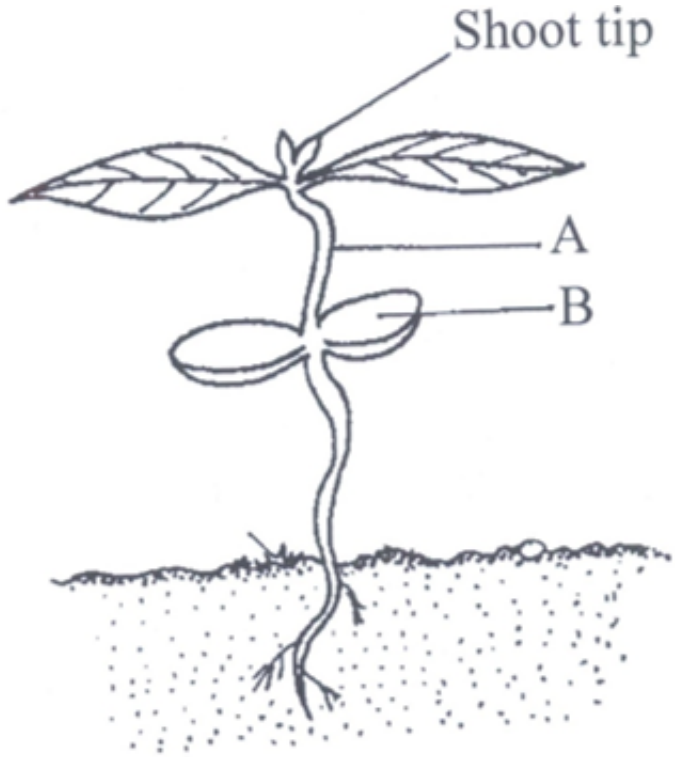
the medulla of the kidney on the re-absorption of water from the collecting duct.

c) Most of the sodium chloride filtered into the glomerular filtrate is reabsorbed. From which part of the nephron does this re-absorption take place?

d) How is re-absorption of the sodium chloride controlled?

e) Name the process that occurs in the part labeled W.

4. The diagram below shows a germinating seedling



a) i) Name the parts labeled A and B and give one function for each.

ii) State the type of germination exhibited by the germinating seedling.

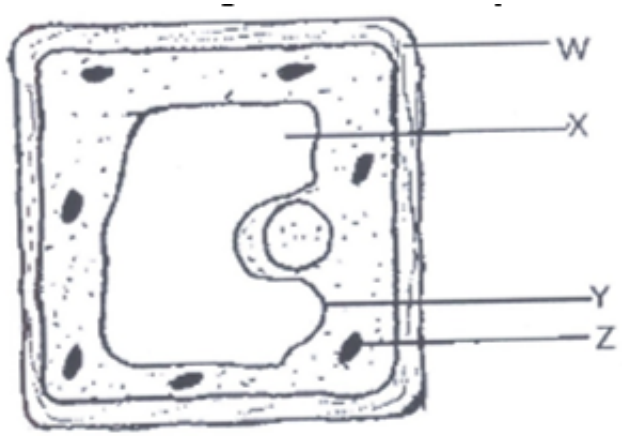
b) State the importance of the following environmental conditions that are necessary for seed germination.

i) Oxygen

ii) Water

iii) Temperature

5. Examine the diagram below carefully and use it to answer the questions that follow.



a) Name the parts labelled X, Y and Z. (3marks)

X

Y

Z

b) State the substance by which the part labelled W is made up of

c) Name the process by which mineral salts move into the structure labelled X.

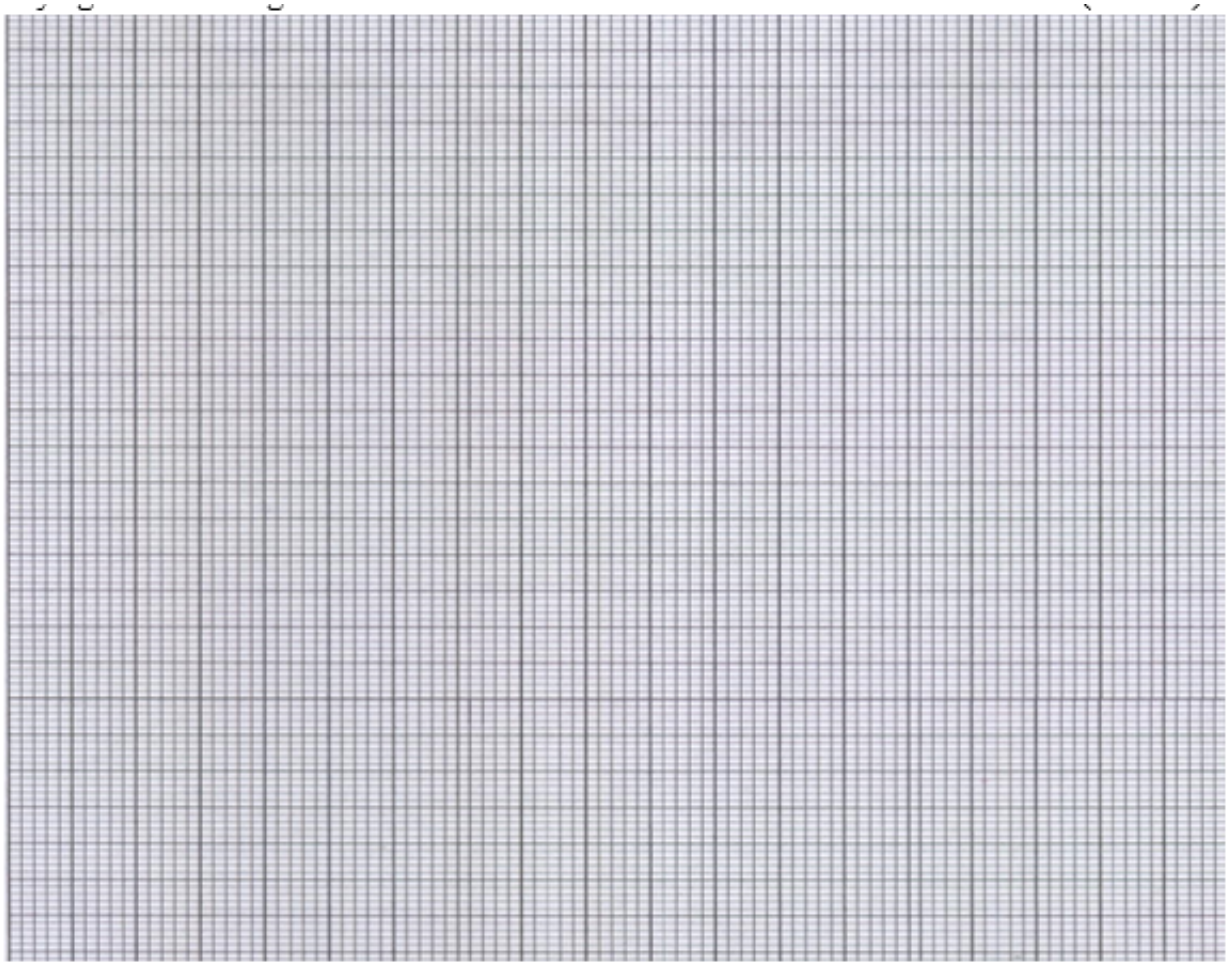
d) Explain what happens to a red blood cell when placed in distilled water.

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

6. In an experiment, the energy required by persons of different sizes were determined, their weights and amount of energy their bodies used at rest were measured. The results were shown in the table below.

Weight of individuals (Kgs)	Amount of energy used per kg of body weight per day in KJ
5	300
15	200
25	150
35	130
45	115
55	105
65	100
75	95

a) Using a suitable scale draw a graph of the amount of energy used per kg of body weight per day against the weight of individuals



i) From the graph determine the energy requirement of a person weighing 10kg.
ii) What is the difference in energy requirements between persons weighing 60 and 70kg.

b) Why did individuals with bigger body size require lesser energy per Kg of body weight than one with smaller size?

c) Use the graph to determine the energy requirement of an infant whose body weight is 2.5Kg.

d) i) How would the results differ if the experiment was repeated using reptiles of equivalent weight as humans instead of the human beings?

ii) Give a reason for your answer in (d) (i) above.

e) Apart from body weight, which other factors determines the energy required by an individual.

f) Name the class of food that provided energy to a mammal during starvation.

g) State one function of rhoughage in a diet of a mammal.

7. Describe how the mammalian heart is adapted to its function.

8. Discuss the role of plant hormones in growth and development.