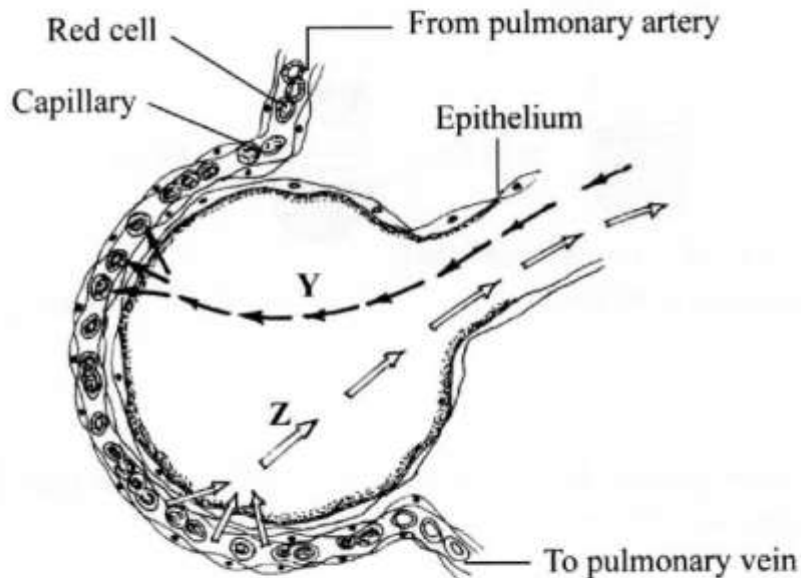


SECTION A (40 marks)

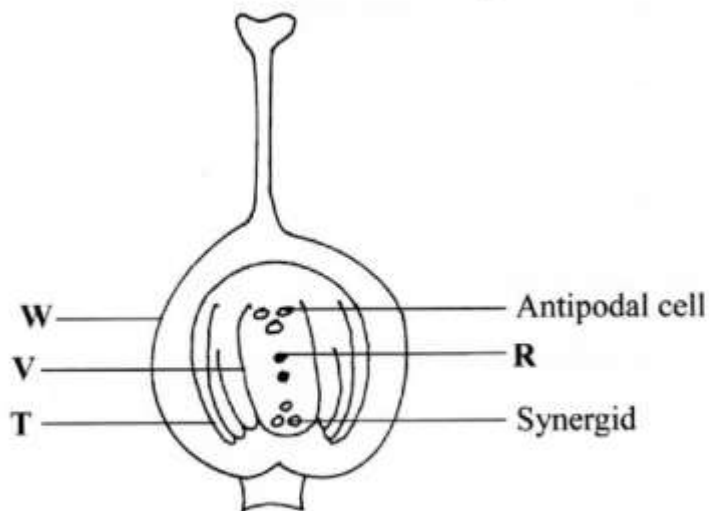
Answer *all* the questions in this section in the spaces provided.

- 1 The diagram below illustrates a blood capillary surrounding a structure for gaseous exchange in human beings.



- (a) Name the gaseous exchange structure. (1 mark)
- (b) Identify the gases labelled Y and Z.
- Y (1 mark)
- Z (1 mark)
- (c) How does the gas labelled Y reach the inside of the blood capillary? (3 marks)
- (d) How does cigarette smoking lead to lung cancer? (2 marks)

- 2 The diagram below illustrates the structure of the female part of a flower.



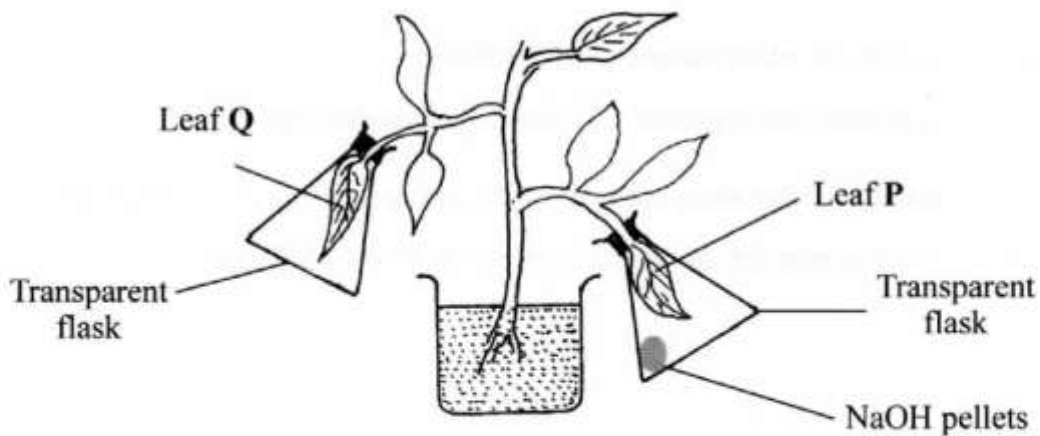
- (a) Name the part labelled **W**. (1 mark)
- (b) Describe what happens when the pollen tube enters the structure labelled **V**. (5 marks)
- (c) What do the structures labelled **R** and **T** develop into after fertilization?

R (1 mark)

T (1 mark)

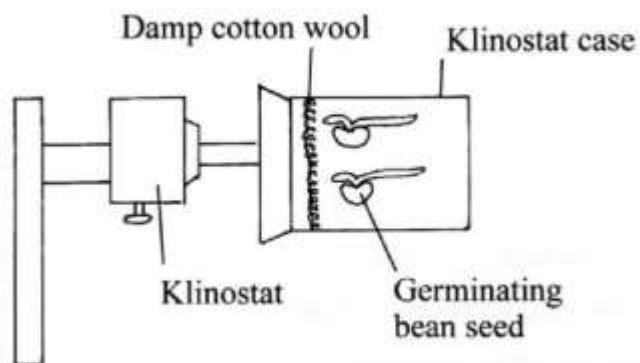
- 3**
- (a) What is meant by the term genetics? (1 mark)
 - (b) State two examples of discontinuous variation. (2 marks)
 - (c) A female with sickle cell trait marries a normal man. The allele for sickle cell is Hb^s and the normal allele is Hb^A . Determine the probability that their first born will have the sickle cell trait. Show your working. (5 marks)

- 4** In an experiment to investigate a factor affecting photosynthesis, a potted plant which had been kept in the dark overnight was treated as shown in the diagram below and exposed to light.



- (a) Why was the potted plant kept in the dark overnight? (1 mark)
- (b) Which factor was being investigated in the experiment? (1 mark)
- (c) (i) Which test did the students perform to confirm photosynthesis in the leaves labelled **P** and **Q**? (1 mark)
- (ii) State the results obtained in the leaves labelled **P** and **Q**.
 - P** (1 mark)
 - Q** (1 mark)
- (iii) Explain the results obtained in the leaves labelled **P** and **Q**.
 - P** (1 mark)
 - Q** (1 mark)
- (d) What was the purpose of leaf **Q** in the experiment? (1 mark)

- 5 In an experiment to investigate a plant response, the set up shown in the diagram below was used.

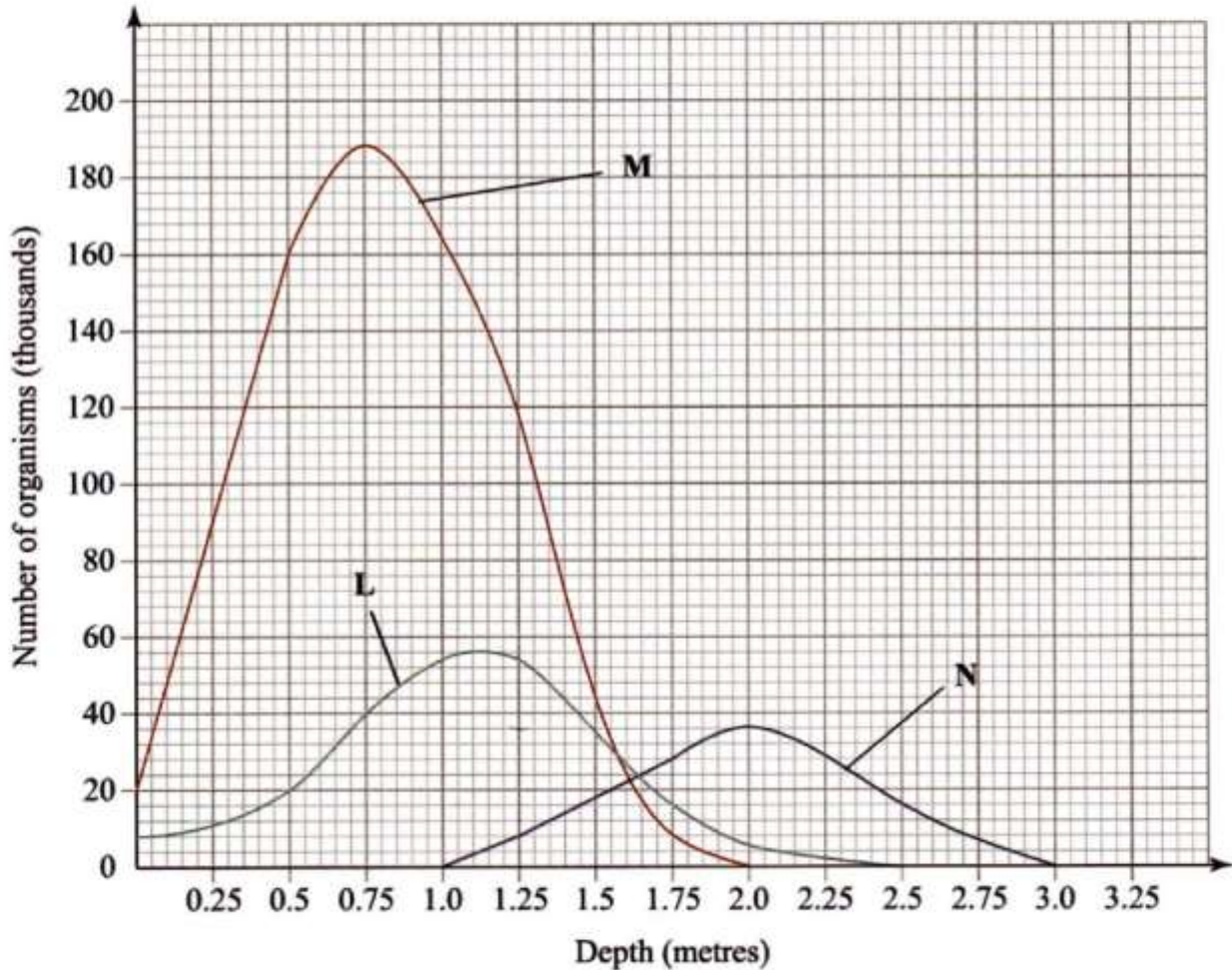


- (a) Name the type of response that was being investigated. (1 mark)
- (b) If the Klinostat was **not** rotating:
- (i) state the observations that would be made on the seedlings after three days; (2 marks)
 - (ii) explain the observations in (b) (i) above. (3 marks)
- (c) If the experiment was repeated with the Klinostat rotating:
- (i) state the observation that was made on the seedlings after three days; (1 mark)
 - (ii) give a reason for the observation made on the seedlings. (1 mark)

SECTION B (40 marks)

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

6 The graph below shows the relative numbers of three main species of organisms in a pond.



- (a) Giving a reason for your answer, which of the species is a
- (i) producer? (1 mark)
Reason (1 mark)
 - (ii) secondary consumer? (1 mark)
Reason (1 mark)
- (b) State the depths at which each of the populations labelled L, M and N is at its optimum.
- L (1 mark)
 - M (1 mark)
 - N (1 mark)

- (c) (i) Which method may have been used to determine the population of organisms labelled N in the pond? (1 mark)
- (ii) Give a reason for your answer in (c) (i) above. (1 mark)
- (iii) State the assumptions made when using the method in (c) (i) above. (4 marks)
- (d) State **two** reasons why primary productivity in the pond decreases with depth. (2 marks)
- (e) Explain the ecological importance of fungi to plants. (2 marks)
- (f) Why is flooding likely to lead to a cholera outbreak? (3 marks)
- 7 Explain the various ways in which seeds and fruits are adapted to dispersal. (20 marks)
- 8 How is a mammalian heart structurally adapted to its function? (20 marks)