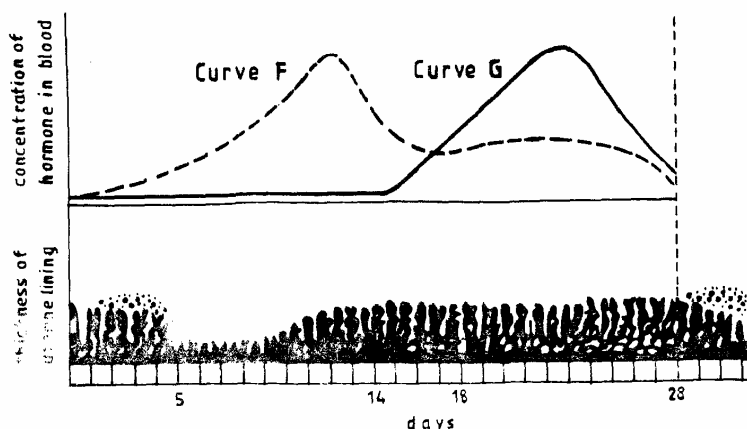


SECTION A (40 marks)

Answer ALL the questions in this section in the spaces provided.

- 1 The figure below shows changes that take place during menstrual cycle in human.

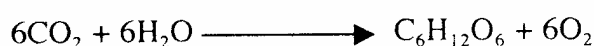


- (a) Name the hormones whose concentrations are represented by curves **F** and **G**.
(2 marks)
- (b) State the effects of the hormones named in (a) above on the lining of the uterus.
(2 marks)
- (c) (i) Name the hormone which is released by the pituitary gland in high concentration on the 14th day of the menstrual cycle.
(1 mark)
- (ii) State **two** functions of the hormone named in (c)(i) above.
(2 marks)
- (d) State the fertile period during the menstrual cycle.
(1 mark)
- 2 A pea plant with round seeds was crossed with a pea plant that had wrinkled seeds. The gene for round seeds is dominant over that for wrinkled seeds.

Using letter **R** to represent the dominant gene state:

- (a) the genotype of parents if plant with round seeds was heterozygous; (2 marks)
- (b) the gametes produced by the round and wrinkled seed parents; (2 marks)
- Round seed parent.....
- Wrinkled seed parent.....
- (c) the genotype and phenotype of F_1 generation. Show your working. (3 marks)
- (d) What is a test-cross? (1 mark)

- 3 The equation below represents a process that takes place in plants:



- (a) Name the process. (1 mark)
- (b) State **two** conditions necessary for the process to take place. (2 marks)
- (c) State what happens to the end-products of the process. (5 marks)
- 4 (a) Give **three** reasons in each case why support is necessary in:
- (i) plants; (3 marks)
- (ii) animals. (3 marks)
- (b) Why is movement necessary in animals? (2 marks)

- 5 A freshly obtained dandelion stem measuring 5cm long was split lengthwise to obtain two similar pieces.

The pieces were placed in solutions of different concentrations in petri dishes for 20 minutes.

The appearance after 20 minutes is as shown.



- (a) Account for the appearance of the pieces in solutions L₁ and L₂. (6 marks)
- (b) State the significance of the biological process involved in the experiment. (2 marks)

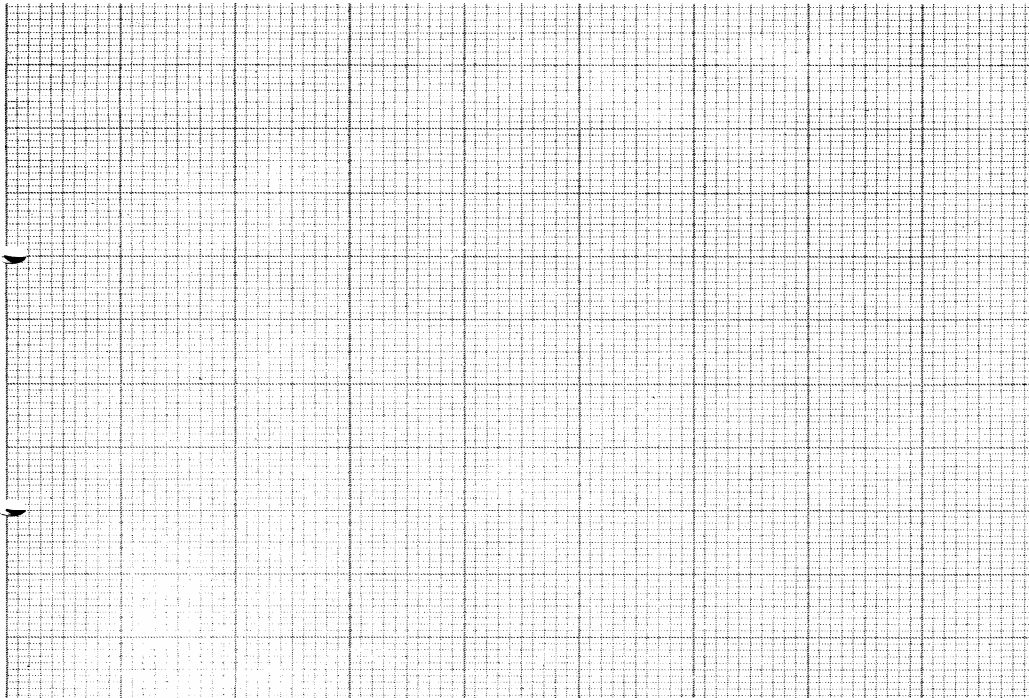
SECTION B (40 marks)

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

- 6** An experiment was carried out to investigate transpiration and absorption of water in sunflower plants in their natural environment with adequate supply of water. The amount of water was determined in two hour intervals. The results are shown in the table below.

Time of day	Amounts of water in grammes	
	Transpiration	Absorption
11 00 – 13 00	33	20
13 00 – 15 00	45	30
15 00 – 17 00	52	42
17 00 – 19 00	46	46
19 00 – 21 00	25	32
21 00 – 23 00	16	20
23 00 – 01 00	08	15
01 00 – 03 00	04	11

- (a) Using the same axes, plot graphs to show transpiration and absorption of water in grammes against time of the day. (7 marks)



- (b) At what time of the day was the amount of water the same for transpiration and absorption? (1 mark)
- (c) Account for the shape of the graphs of:
- (i) transpiration; (3 marks)
 - (ii) absorption. (3 marks)
- (d) What would happen to transpiration and absorption of water if the experiment was continued till 05 00 hours? (2 marks)
- (e) Name **two** factors that may affect transpiration and absorption at any given time. (2 marks)
- (f) Explain how the factors you named in (e) above affect transpiration. (2 marks)
- 7** Describe the nitrogen cycle. (20 marks)
- 8** (a) State **four** characteristics of gaseous exchange surfaces. (4 marks)
- (b) Describe the mechanism of gaseous exchange in a mammal. (16 marks)