



SECTION A

1. (a) Point out two similarities and two differences between an animal cell and a plant cell.  
 (b) Outline the functions of a nucleus. (7 Marks)
2. Figures 1(a) and 1(b) show the life cycles of two different insects.

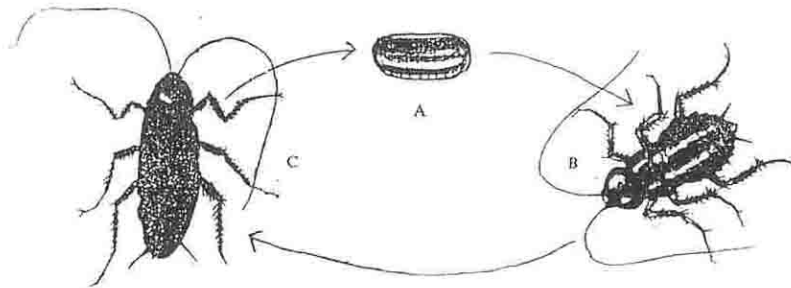


FIGURE 1a

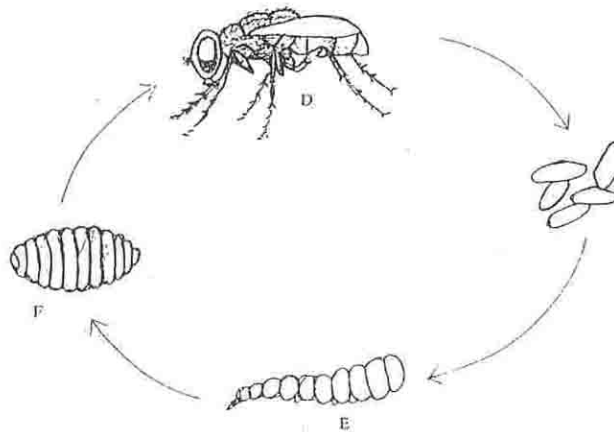


FIGURE 1b

- (a) Identify stages A, B, C, D, E and F.  
 (b) Giving reasons identify the types of metamorphosis exhibited in each life history or cycle above and state any two examples of insects undergoing each type of metamorphosis. (7 marks)
3. (a) Can water enter xylem vessels by osmosis? Give reasons to support your answer.  
 (b) Name three forces which are believed to cause flow of water through xylem. Are these forces active or passive? (7 marks)
4. (a) Mention four roles of carbohydrates in the plant body.  
 (b) Explain what you understand by the term disaccharides and name any two examples. (7 marks)
5. (a) State the roles of  
 (i) Bowman's capsule  
 (ii) Proximal convoluted tubule  
 (iii) Loop of henle  
 (iv) Distal convoluted tubule  
 (v) Collecting duct

- (b) Name the plant hormones that
- initiate root development
  - ripen orange rapidly
  - induce cell division
- (8 Marks)
6. (a) Distinguish between sex determination and sex linkage.
- (b) Define the following terms:
- Chromosomal mutation
  - Co-dominance
  - Polygenic inheritance
- (8 Marks)
7. (a) Briefly explain the significance of meiosis in sexually reproducing organisms.
- (b) Give three differences between mitosis and meiosis.
- (8 Marks)
8. What do you understand by the following as used in evolution?
- Law of use and disuse.
  - Convergent evolution.

(8 Marks)

### SECTION B

9. (a) In an experiment, dry cotton wool was placed at the bottom of four conical flasks labelled A, B, C and D. An equal number of dry bean seeds were placed in each flask.

The conditions for the four conical flasks were then varied as shown in the diagram below (figure 2) and left for some few days.

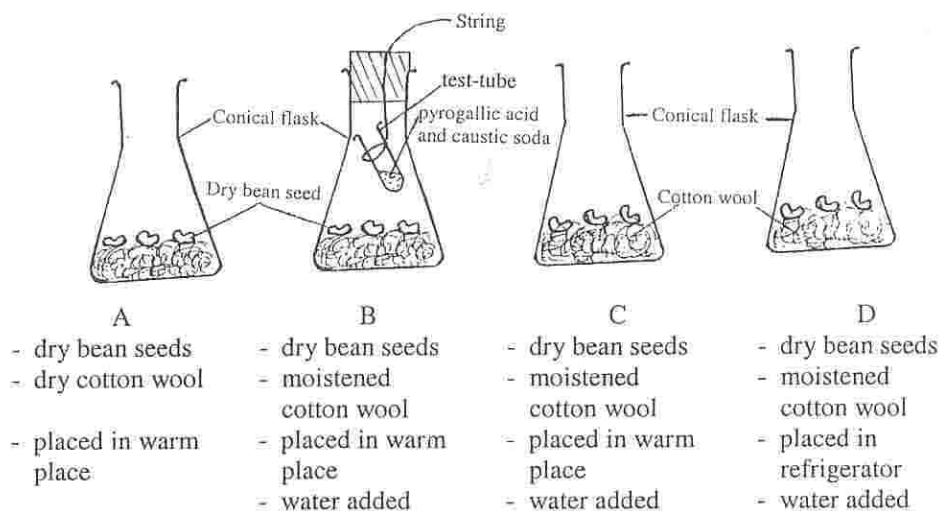


FIGURE 2

- What was the aim of the experiment?
- What was the purpose of including pyrogalllic acid and caustic soda in conical flask B?
- Draw a diagram of conical flask C and show how the seeds in this flask will appear at the end of the experiment.

- (b) What could be the possible reasons for failure of viable seeds to germinate when they are sown under optimum conditions for germination?

(10 Marks)

10. Study the photograph (figure 3) below carefully.



FIGURE 3

- (a) (i) Giving reasons explain what happens to the breathing rate and heart beat in the men shown in the photograph.
- (ii) Explain briefly why the muscles of these men are going to experience anaerobic respiration.
- (b) How does anaerobic respiration differ from aerobic respiration?
- (10 Marks)
11. (a) The term “growth” when applied to bacteria differs from how it is applied to higher plants and animals. Briefly show this difference.
- (b) Distinguish between the meaning of excretion and secretion.
- (10 Marks)
12. (a) Define “Speciation”
- (b) How does adaptive radiation and genetic variation bring about speciation?
- (10 Marks)