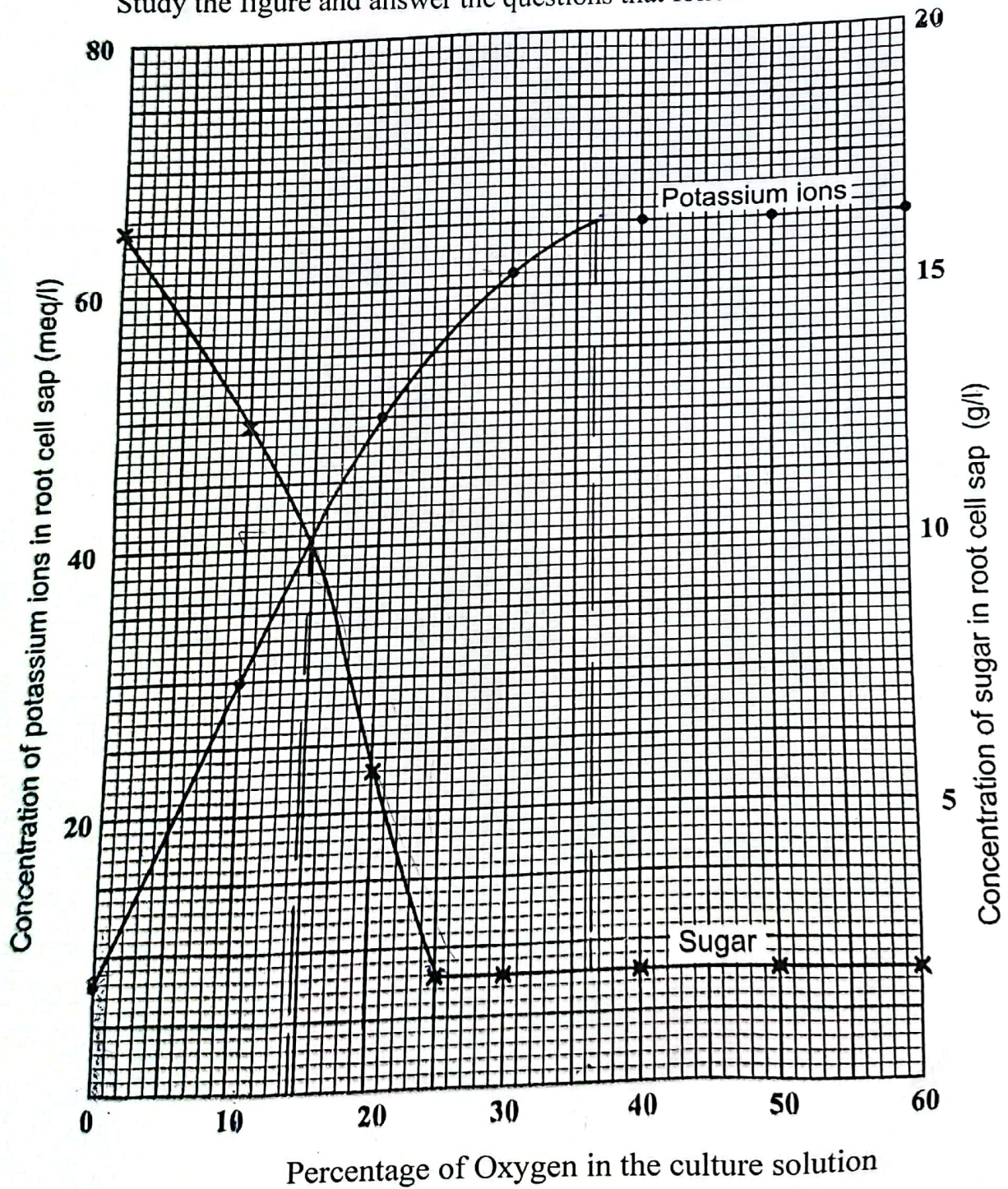


SECTION A (40 MARKS)

Question 1 is compulsory.

1. In an experiment, cells obtained from the root of wheat seedlings were studied in a culture media of varying oxygen concentrations. The effect of oxygen concentrations on the uptake of potassium ions in the root cell sap, and the consumption of sugar by the root cell sap were investigated and the results presented as shown in figure L

Study the figure and answer the questions that follow.



- (a) Describe the variations in the concentration of;

(i) potassium ions in the root cell sap over different percentages of oxygen in the culture solution. (03 marks)

(ii) sugar in the root cell sap over different percentages of oxygen in the culture solution. (02 marks)

(b) Explain the effects of increasing the percentage of oxygen in the culture solution on the concentration of; (i) sugar in the root cell sap. (11 marks)

(ii) potassium ions in the root cell sap. (08 marks)

(c) Suggest reasons for the presence of potassium ions in the cell sap of the roots at 0 % oxygen in the culture solution. (06 marks)

(d) Explain what would happen to the concentration of potassium ions in the root cell sap if in another experiment potassium cyanide was added in small quantities into the culture solution at 20 % oxygen. (06 marks)

(e) Explain two other factors that may favour absorption of potassium ions. (04 marks)

SECTION B (60 MARKS)

Answer any three questions from this section.

Any additional question(s) answered will not be marked.

(a) What is the importance of osmoregulation in animals? (02 marks)

(b) Explain how mammals living in arid areas overcome the problem of water shortage. (18 marks)

(a) How is light involved in the production of ATP during photosynthesis? (08 marks)

(b) Explain how the energy contained in ATP molecules produced during photosynthesis is assimilated in the body of a herbivore. (12 marks)

(a) What is meant by the term variation? (02 marks)

(b) Apart from mutation, explain how genetic variation arises in sexually reproducing species. (10 marks)

(c) How does polyploidy lead to variation in species? (08 marks)

- (a) What is meant by the term population in ecology?(02 marks)
- (b) What assumptions are made when using capture-recapture method of estimating population size? (08 marks)
- (c) Explain the ways in-breeding affects a natural population. (06 marks)
- (d) Suggest factors which may contribute to a climax community being unstable. (04 marks)

6. (a) Describe the process of primary growth in plants.(06 marks) (b)

Describe the role of gibberellins in plant growth. (07 marks)

- (c) Explain the meaning and role of seed dormancy in the life cycle of a flowering plant. (07 marks)