A level Biology seminar questions

Date: 21st April, 2022

Time: 2:00pm – 6:00pm

1. (a). Describe features of carrier mediated transport across the plasma membrane. (08 marks)

   (b) Describe the mechanism of phagocytosis in a neutrophil. (06 marks)

   (c) Compare facilitated diffusion with active transport. (08 marks)

   (d) Explain the sequence of events that occur when a plant cell is placed in

   (i) Weak solution

   (ii) Strong solution (10 marks)

   (e) Describe the adaptations of the transport proteins that make up the cell membrane to their role. (08 marks)

2. **Figure 1** shows the growth of a single plant leaf with its **import (+)** and **export (-)** of sucrose and phosphorus during a period of 40 days. Study the figure and answer the questions that follow.

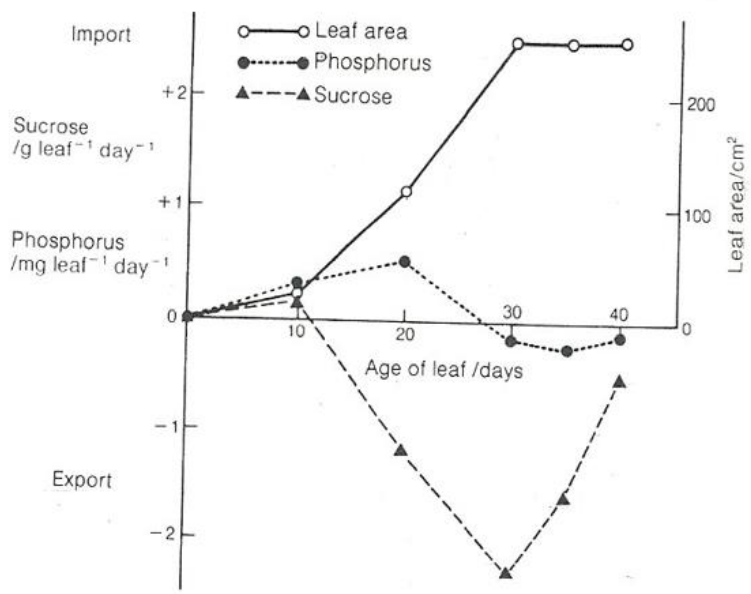

Fig. 1

a) From figure 1 above, explain the relationship between:

   i) Leaf area and movement of sucrose. (*09 marks*)

   ii) Age of leaf and movement of phosphorus. (*08 marks*)

b) Describe how the following are imported and exported through the leaf:

   i) Sucrose. (*03 marks*)

   ii) Phosphorus.

3. The graph in **Figure 2** shows the rate of water flow up a tree and the diameter of the tree trunk over a 24-hour period. Study the figure and answer the questions that follow:

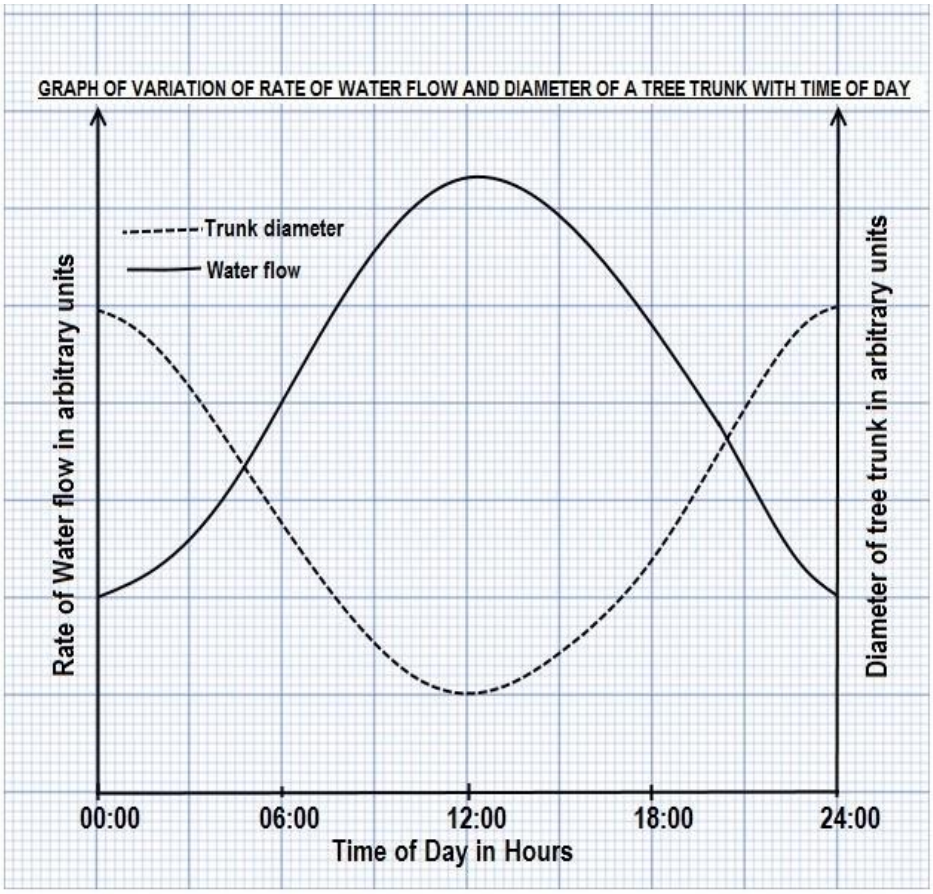

Fig. 2

(a) Describe the changes in the:

(i) Rate of flow of water during the 24-hour period.

(ii) Diameter of the tree trunk over the 24-hour period.

(b) Explain the changes in the:

(i) Rate of flow of water during the 24-hour period. (*08 marks*)

(ii) Diameter of the tree trunk over the 24-hour period. (*06marks*)

(c) Explain:

(i) What would happen to the rate of water flow if the tree was sprayed with the herbicide ammonium sulfamate that kills living cells. (*06 marks*)

(ii) How plant tissues for water transport in the trunk are **adapted** for diurnal changes in diameter? (*04 marks*)

The graph in **Figure 3** shows changes in linear velocity of flow of sap through the xylem of a tree trunk and one of its small branches at the top. Measurements were taken at two-hourly intervals on a hot day. Study the figure and answer the questions that follow

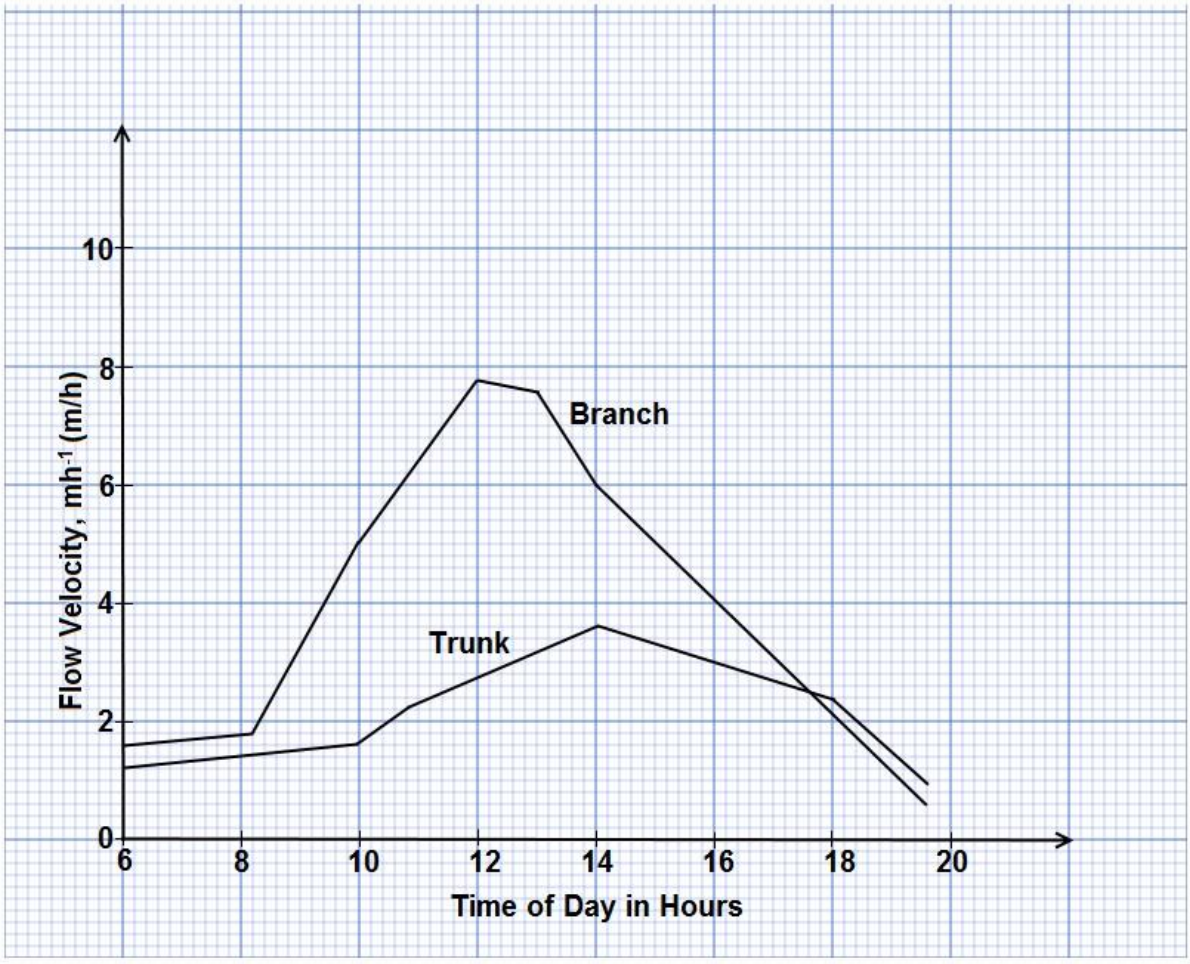

Fig. 3

(d) From **figure 3**, explain the relationship between the size of plant parts and linear flow velocity of sap through the xylem during daylight hours. (*08 marks*)

4. Fig. **4** shows the results from an experiment in which the effect of different concentrations of substrate on the rate of an enzyme-catalysed reaction was investigated.

   The experiment was then repeated using the same experimental conditions and substrate concentrations but in the presence of fixed amounts of compounds **A** and **B** (0.2 mM).

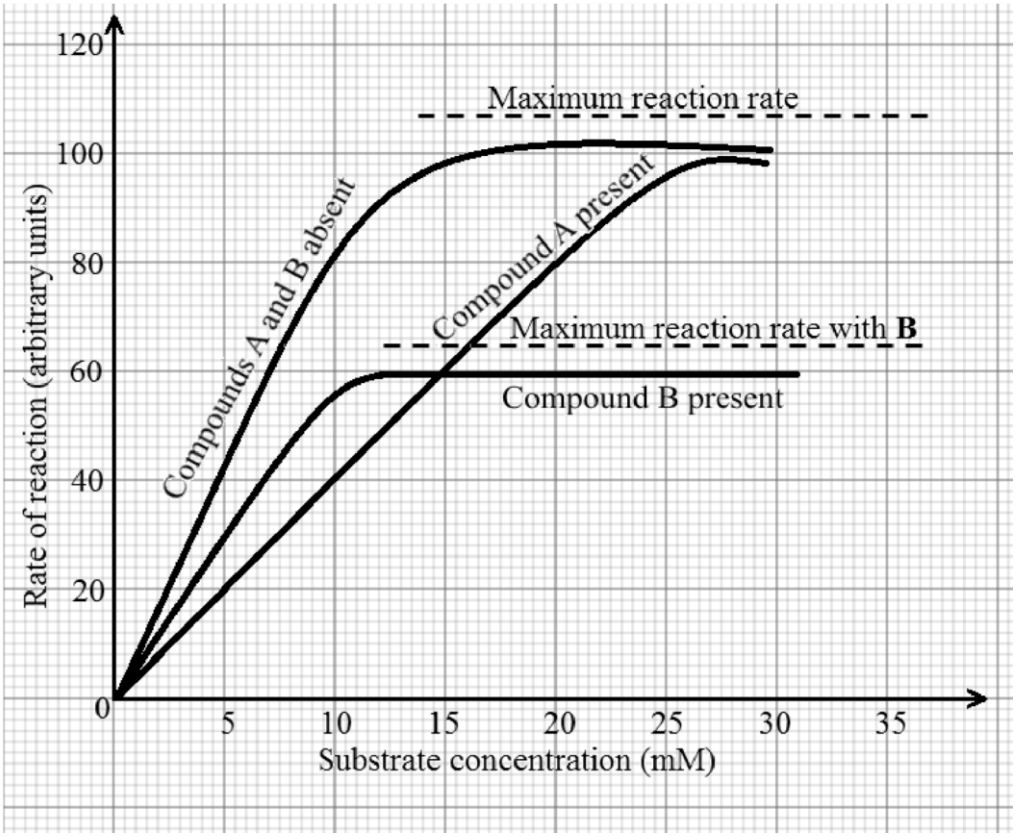

Fig. **4**

a. Describe the relationship between the rate of reaction and substrate concentration when

   i. compounds **A** and **B** were absent. (*04 marks*)

   ii. compound **A** was present. (*03 marks*)

   iii. compound **B** was present. (*03 marks*)

b. Explain the experimental results in the

   i. absence of compounds **A** and **B**. (*06 marks*)

   ii. presence of compound **A**. (*07 marks*)

   iii. presence of compound **B**. (*07 marks*)

c. Compare the rate of reaction in the presence of compounds **A** and **B**. (*05 marks*)

d. What might be the effect of using 0.4 mM of compound **A** in the investigation? (*02 marks*)

e. Suggest why compounds with similar properties to compounds **A** and **B** are often used to combat bacterial infections in the body. (*03 marks*)