**9.4 Translocation - Exam Questions**

**1.** Research using carbon dioxide containing a radioactive label, C14, has revealed the following evidence about the mechanism of translocation:

**A** labelled carbon can be observed in the phloem soon after being supplied to a well-lit plant;

**B** the rate of movement of sugars in the phloem is many times faster than could be achieved by diffusion alone.

Different research has revealed that:

**C** an insect such as an aphid feeds by inserting its proboscis (mouth parts) into the phloem;

**D** the pH of the phloem companion cells is lower than surrounding cells;

**E** the phloem companion cells contain many mitochondria.

Using the letters **A**, **B**, **C**, **D** and **E**, select **two** pieces of evidence from the list above which support the theory that translocation occurs in the phloem.

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[Total 2 marks]

**2.** State what is meant by the terms *source* and *sink*.

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[Total 2 marks]

**3.** (a) From the list below, circle the carbohydrate that is transported in phloem.

**auxin** **fructose** **glucose** **glycine** **glycogen** **starch** **sucrose**

[1]

(b) Phloem is responsible for the transport of carbohydrate in plants. The diagram below shows the structure of the cells in phloem.



*A-level Biology,* page 362 Fig. 31.10A,  
by W D Phillips and T J Chilton,  
published by Oxford University Press,  
1989. (ISBN 0 19 914089 8)

(i) Name the cells **P** and **Q** in the diagram.

**P** .............................................................................................................

**Q** ............................................................................................................

[2]

(ii) Outline how **P** and **Q** are involved in the transport of carbohydrate in phloem.

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[3]

[Total 6 marks]

**4.** Carbohydrate moves from regions of plants called sources to regions called sinks.

Explain how, at different times, the same plant root may be a source or a sink.

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[Total 2 marks]

**5.** Various hypotheses for the mechanism of transport in phloem have been suggested.  
One hypothesis proposes that movement between sources and sinks occurs entirely passively by the process of mass flow.

The diagram below shows a physical model to illustrate the principle of mass flow.



(i) Give an example in plants of:

a source ..........................................................................................................

a sink ...............................................................................................................

[2]

(ii) Use the information in the diagram to explain how mass flow of materials between the source and the sink would be brought about.

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[4]

[Total 6 marks]

**6.** There is evidence that sugar transport from sources to sinks in plants does not only involve passive movement by mass flow. There is also an active part to the mechanism.

(i) State **one** piece of evidence for the involvement of an active process.

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[1]

(ii) Describe an active mechanism which could possibly be involved in the transport of sugars from sources to sinks.

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[3]

[Total 4 marks]