Surname	Centre Number	Candidate Number
Other Names		2

GCE AS/A level

1072/01

BIOLOGY – BY2

P.M. MONDAY, 2 June 2014

1 hour 30 minutes

Suitable for Modified Language Candidates

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**15**	
2.	**13**	
3.	**10**	
4.	**13**	
5.	**9**	
6.	**10**	
Total	**70**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use pencil or gel pen. Do not use correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

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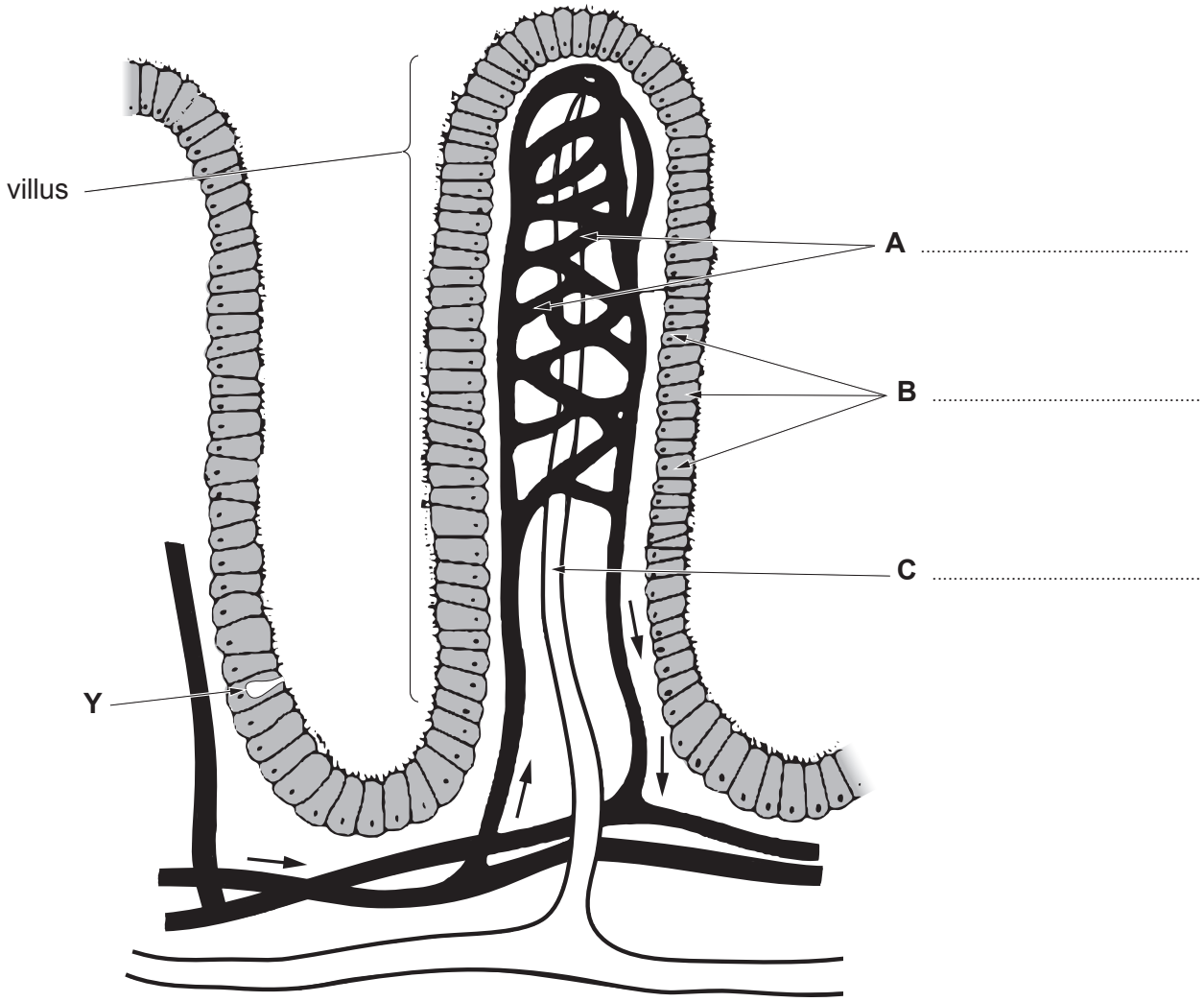
Examiner only

Answer **all** *questions.*

1. The diagram below shows a villus of the small intestine.



(a) Complete the diagram above by naming the structures **A**, **B** and **C**. [3]

(b) With reference to the diagram **only**, describe and explain **two** features that are important in the functioning of the villus. [4]

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Examiner only

(c) (i) Name the substance secreted by cell type **Y**. [1]

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(ii) Explain **two** functions of the secretion of cell type **Y** in the process of digestion. [2]

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(d) Layers of smooth muscle are found in the wall of the small intestine. Explain the role of these muscle layers in the process of digestion. [3]

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(e) Amino acids absorbed by structure **A** are transported to the liver. Describe the fate of the **excess** amino acids absorbed. [2]

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Examiner only

2. *(a)* (i) State what is meant by the term *transpiration*. [2]

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(ii) Give **one** benefit of transpiration to a plant. [1]

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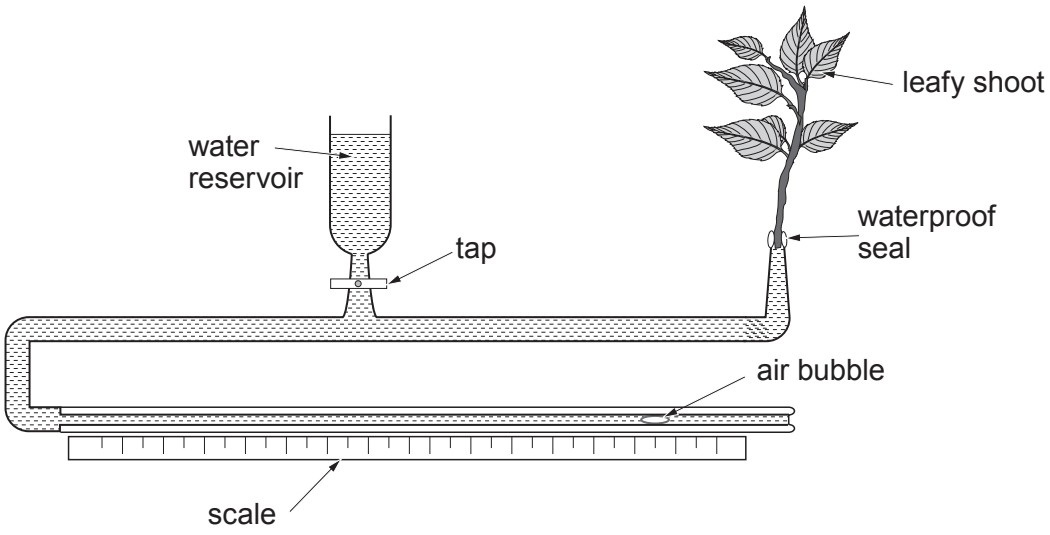
(b) The diagram below shows a piece of apparatus called a potometer which is used to measure the rate of transpiration.



(i) Suggest why the end of the shoot should be cut under water before being inserted into the potometer. [2]

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(ii) State what measurements would have to be made, in order to determine the rate of transpiration. [2]

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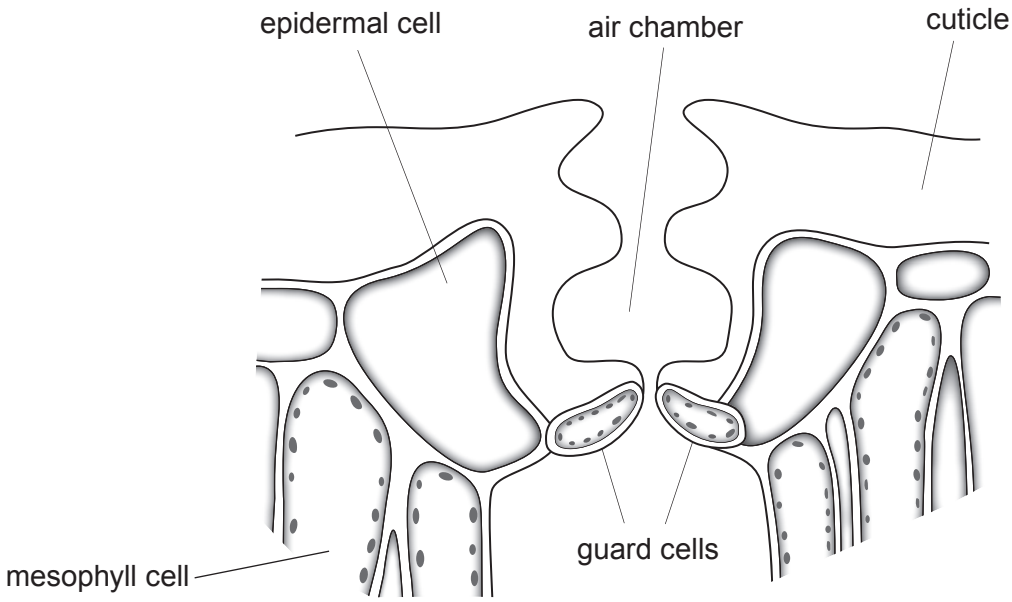
Examiner only

(c) The diagram below shows a sunken stoma which is an adaptation found in the leaves of some plants that live in very dry conditions.



(i) State the general name for plants that live in, and are adapted for, dry conditions. [1]

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(ii) With reference to the diagram, explain how a sunken stoma is able to reduce transpiration. [3]

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(iii) Describe and explain **two** *other* adaptations which reduce the rate of transpiration in plants that live in very dry conditions. [2]

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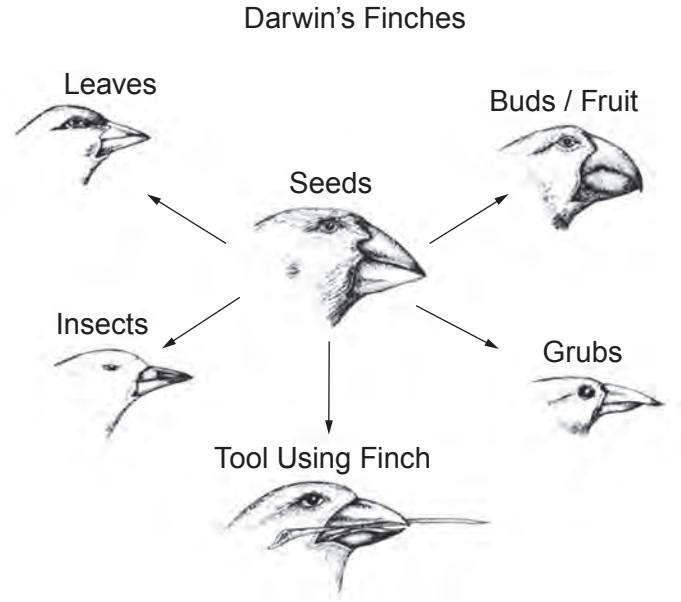
Turn over.

Examiner only

3. *(a)* Darwin's finches are an example of a species diversifying (changing) into several forms to ensure long term survival.
The diagram below illustrates some of these different forms and their food sources.



(i) Name the evolutionary change illustrated by Darwin's finches as shown in the diagram above. [1]

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(ii) Describe the process which results in the evolutionary change shown in the diagram above. [4]

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Examiner only

(b) Although haemoglobin is found throughout the animal kingdom, its amino acid composition varies.

Human haemoglobin is a protein molecule containing 574 amino acids. The haemoglobin of a horse has 557 amino acids in common with humans and the haemoglobin of a gorilla has 572 amino acids in common with humans.

(i) Explain what this information indicates about the evolutionary relationship between the three animal species. [3]

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(ii) Name the technique used to compare the amino acid composition of haemoglobin in different animals. [1]

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(iii) How has this biochemical technique helped improve the classification of organisms? [1]

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Turn over.

Examiner only

4. *(a)* Bony fish rely on gills and gill filaments for gaseous exchange. Explain how the presence of gill filaments is an adaptation to gaseous exchange. [2]

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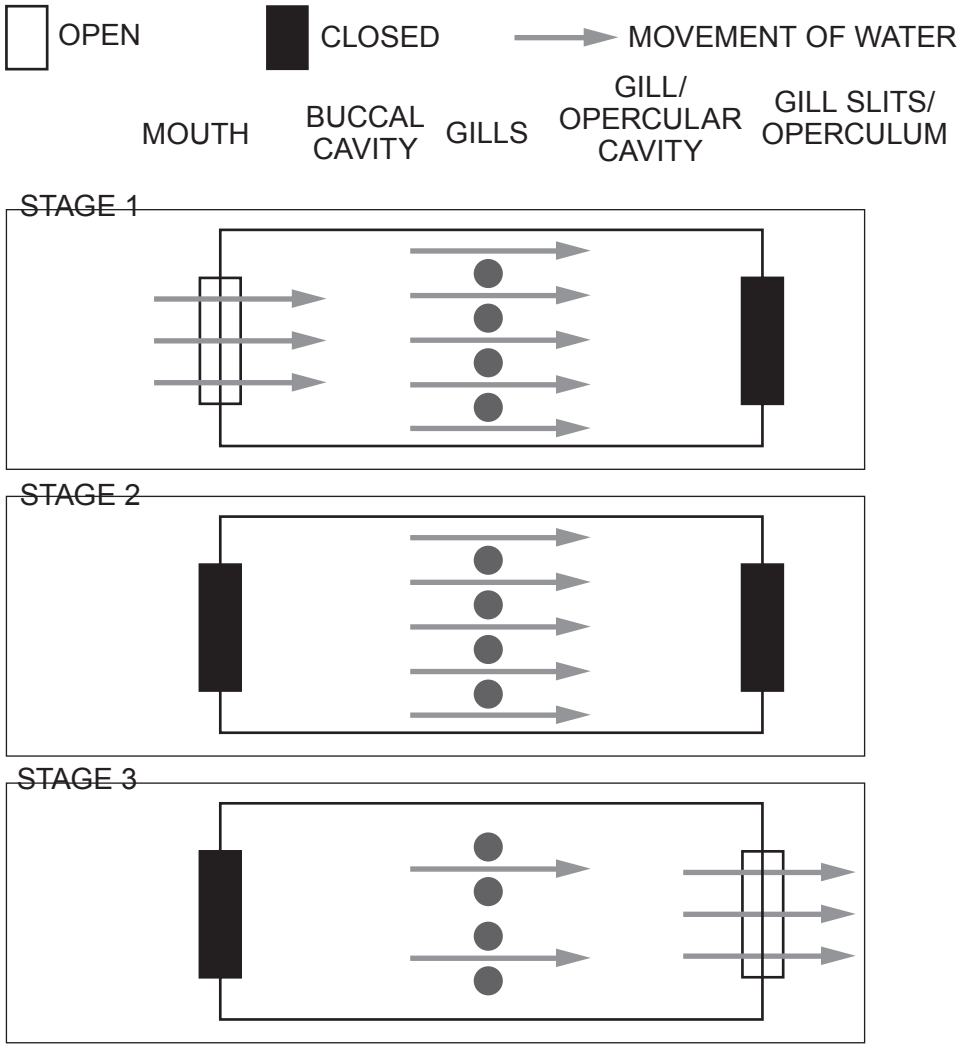
(b) The system of ventilation in a bony fish enables water to be passed continuously over its gills whilst the fish is at rest.
The diagrams below show three stages in the process of ventilation.



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(i) Ventilation of the gills is achieved by pressure changes in the buccal and gill/ opercular cavities. Using information from the diagram opposite and your own knowledge describe the process of ventilation in a bony fish. [4]

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(ii) To increase the efficiency of gas exchange, bony fish use a counter current flow. State what is meant by *counter current flow* and explain how this increases the efficiency of gas exchange in the bony fish. [3]

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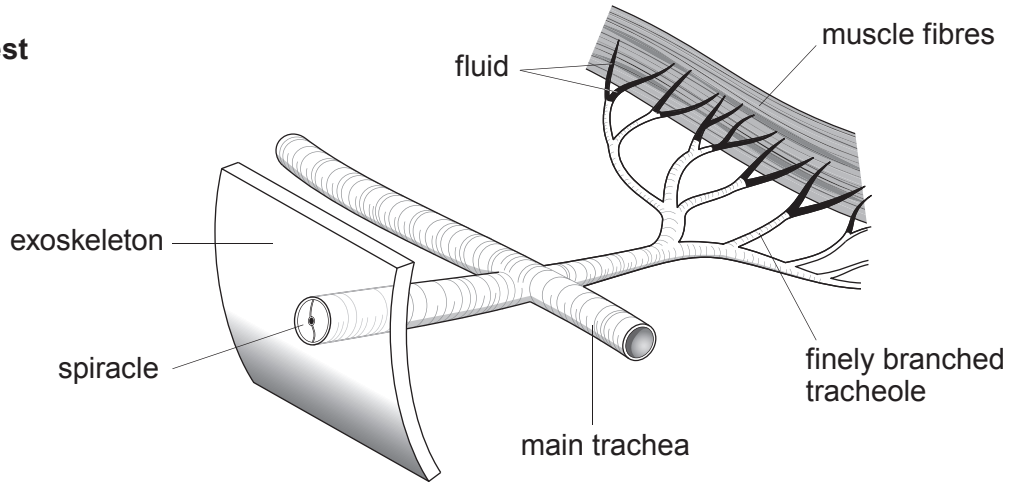
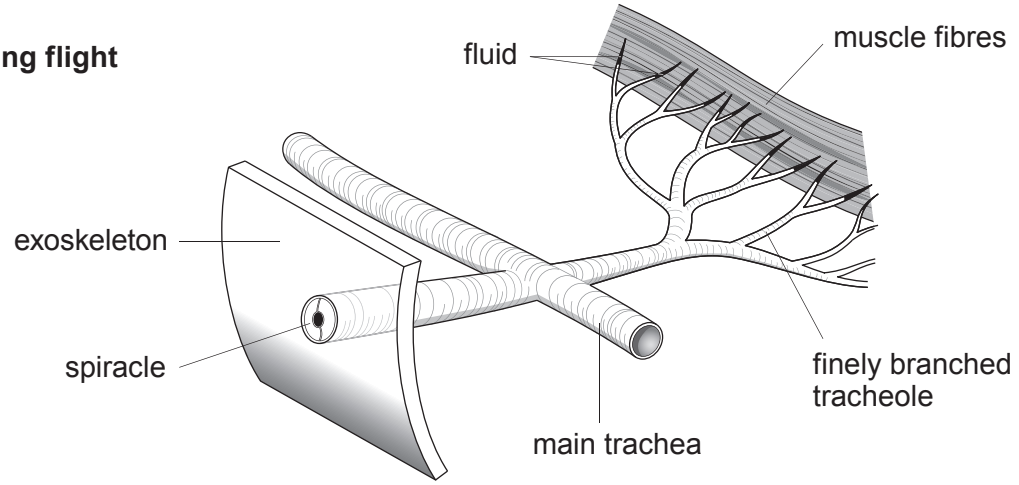
Examiner only

(c) The diagrams below show insect tracheoles supplying muscle fibres at rest and during flight.

At rest



During flight



(i) The tracheoles are found on the outside of the muscle fibres.
Suggest why the maximum diameter of a muscle fibre never exceeds 20 μm in diameter. [2]

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Examiner only

(ii) Describe the change in fluid level in the tracheoles during flight. Suggest how this change benefits gaseous exchange during flight. [2]

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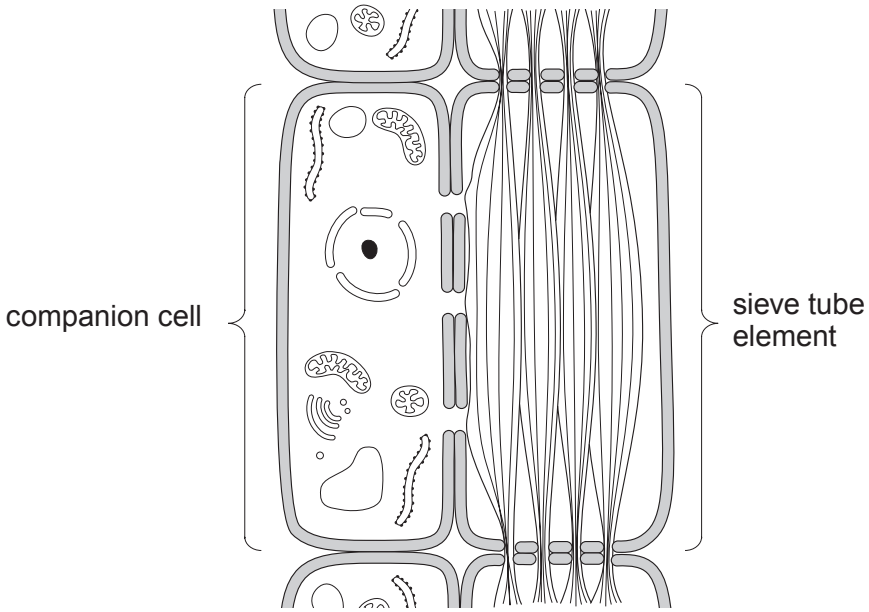
Examiner only

5. The diagram below shows two types of cell that are found in phloem tissue.



(a) Name **two** other types of cell that are found in phloem. [2]

1 .....

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(b) The function of phloem is to transport organic molecules, such as sucrose, in a plant.

Using the diagram only, explain how **two** features of the sieve tube element enable the phloem to carry out its function. [4]

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Examiner only

(c) The mass flow theory is one explanation to account for the movement of solutes in the phloem.
Suggest why the presence of large numbers of mitochondria in the companion cells does **not** support this theory. [3]

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Examiner only

6. Answer **one** of the following questions.
Any diagrams included in your answers must be fully annotated.

Either, *(a)* (i) Describe how carbon dioxide is transported from respiring tissues to the lungs. [6]

(ii) Explain how changes in carbon dioxide concentrations in the blood can lead to an increased oxygen supply for respiring tissues. [4]

Or *(b)* Describe the similarities and differences in the structure and functioning of arteries and xylem vessels. [10]

Examiner only

Turn over.

Examiner only

END OF PAPER

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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