

# Transport mechanism

## Question Paper 3

<b>Level</b>	International A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	CIE
<b>Topic</b>	Transport in plants
<b>Sub Topic</b>	Transport mechanism
<b>Booklet</b>	Theory
<b>Paper Type</b>	Question Paper 3

**Time Allowed :** 56 minutes

**Score :** / 46

**Percentage :** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 A leafy twig was cut from a tree and the cut end immediately placed into water. The twig was then put into a potometer to measure the uptake of water. The potometer was placed on a balance to record changes in mass.

Fig. 4.1 shows the rate of water uptake and the rate of mass loss over a period of 24 hours. The graph also shows when it was light and when it was dark.

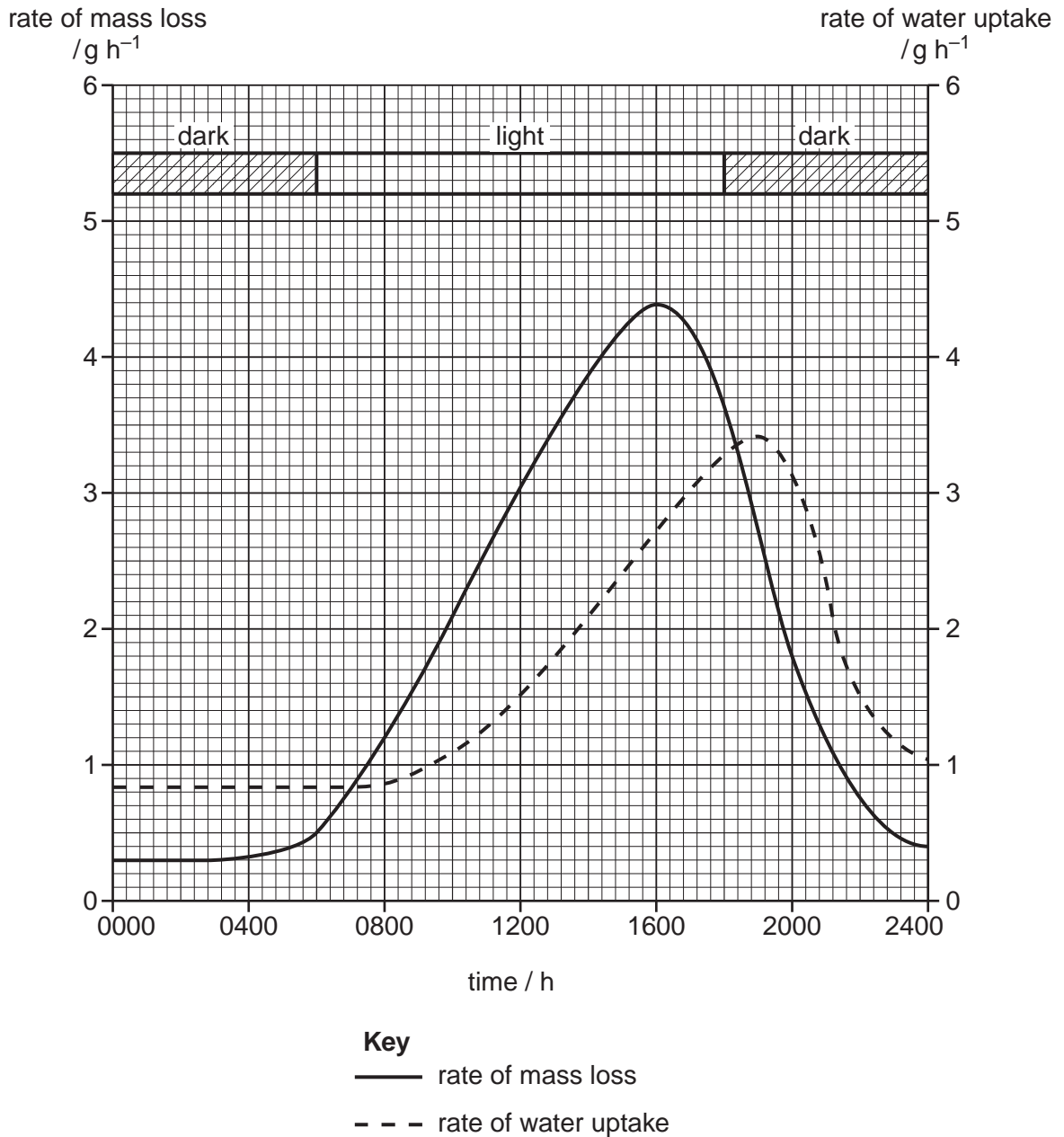


Fig. 4.1

(a) (i) Explain how water was lost from the leaves of the leafy twig.

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..... [3]

(ii) With reference to Fig. 4.1, describe how the rates of water uptake and water loss change during the 24 hour period.

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..... [4]

(b) Explain the mechanism by which water is transported in the xylem of the leafy twig while in the potometer.

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.....  
..... [3]

- 2 Fig. 1.1 is a photograph taken at low tide in a mangrove swamp in Mozambique.



Fig. 1.1

The photograph shows a hermit crab surrounded by the pneumatophores ('breathing roots') of mangrove trees. The hermit crabs live inside the shells of dead molluscs. Large birds, such as Goliath herons, feed on the hermit crabs. The vertical pneumatophores are an adaptation to the soil in the swampy, coastal environment that contains very little oxygen. They are exposed to the air at low tide. The soil has a very high salt content as the sea often covers the area. Some bacteria are able to grow deep in the rich organic mud where the oxygen concentration is very low.

- (a) Listed below are eight ecological terms that can be applied to the mangrove swamp and the organisms that live there.

Use **only** the information given above to match each organism with the most appropriate term from the list. You may use each letter once, more than once or not at all.

mangrove trees

all the organisms in the mangrove swamp

bacteria deep in the mud

all the hermit crabs in the swamp

A primary consumer

B population

C community

D niche

E secondary consumer

F ecosystem

G decomposer

H producer

[4]

**(b)** Explain how the cells in the roots of mangrove trees obtain sufficient oxygen and water in this extreme environment.

oxygen .....

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water .....

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.....[5]

[Total: 9]

3 Fig. 6.1 shows three stages in the cardiac cycle.

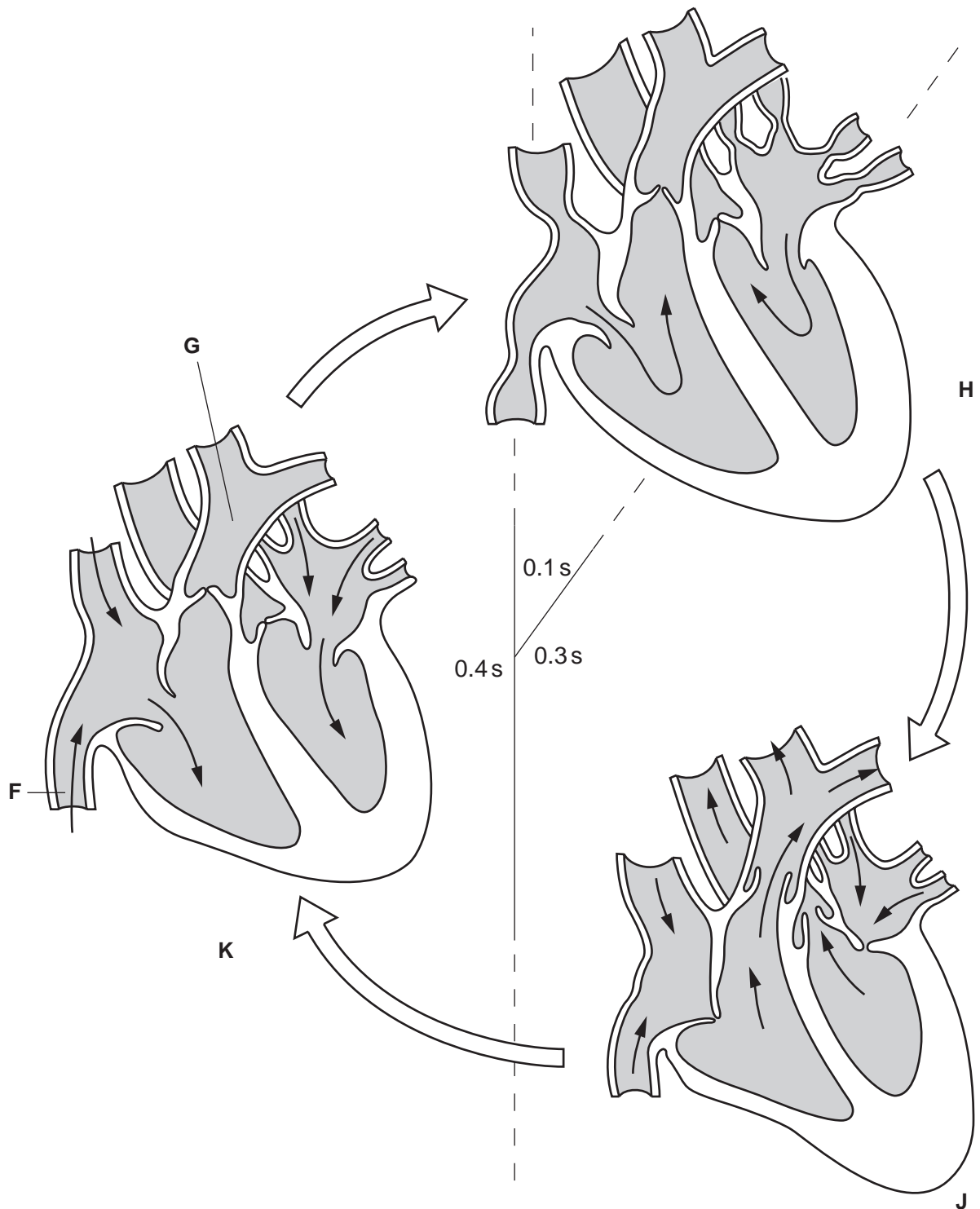


Fig. 6.1

(a) (i) Name the blood vessels labelled F and G.

F .....

G ..... [2]

- (ii) Fig. 6.1 indicates that one heart beat takes 0.8 second.  
State the heart rate in beats per minute.

Answer = ..... [1]

- (iii) Explain why the walls of the atria have thinner muscle than the walls of the ventricles.

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 .....  
 .....  
 .....[2]

- (b) Complete the table to show what is happening to the following parts of the **left** side of the heart at each of the stages, **H**, **J** and **K** as shown in Fig. 6.1:

- left atrium
- left ventricle
- aortic valve.

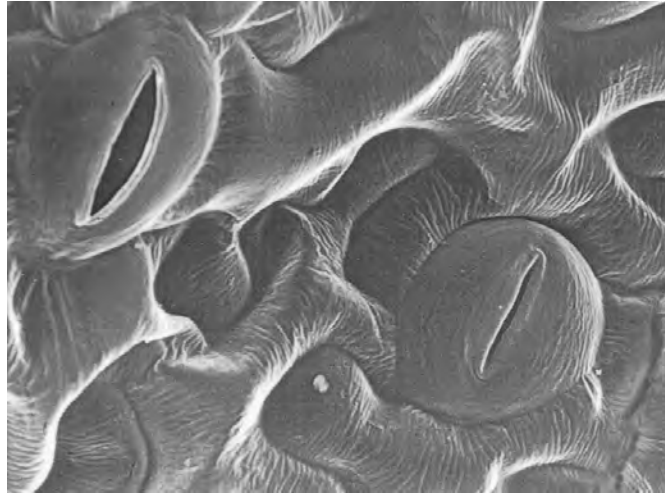
stage	left atrium	left ventricle	atrioventricular valve	aortic valve
<b>H</b>	contracts to force blood into left ventricle	..... ..... ..... .....	open	closed
<b>J</b>	..... ..... ..... .....	..... ..... ..... .....	closed	.....
<b>K</b>	..... ..... ..... .....	relaxes and fills with blood from left atrium	open	.....

[6]

[Total: 11]

- 4 The lower epidermis of a dicotyledonous leaf is perforated with stomata. Each stoma is bounded by two guard cells which control the size of the pore.

Fig. 5.1 shows a scanning electron microscope photograph of an open and a closed stoma.



**Fig. 5.1**

**X4000**

- (a) Calculate the length of the pore of the open stoma in Fig. 5.1.

Show your working.

Answer .....

[2]



**(b)** Explain the importance of abscisic acid, ABA, in causing stomatal closure.

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..... [4]

**(c)** Under conditions of low wind speed, the rate of transpiration decreases, even though the stomata of the leaves are open.

Explain why this is so.

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..... [2]

[Total: 8]

- 5 An athlete exercised for eight minutes. The athlete’s oxygen consumption was measured before, during and after the exercise. The results are shown in Fig. 6.1.

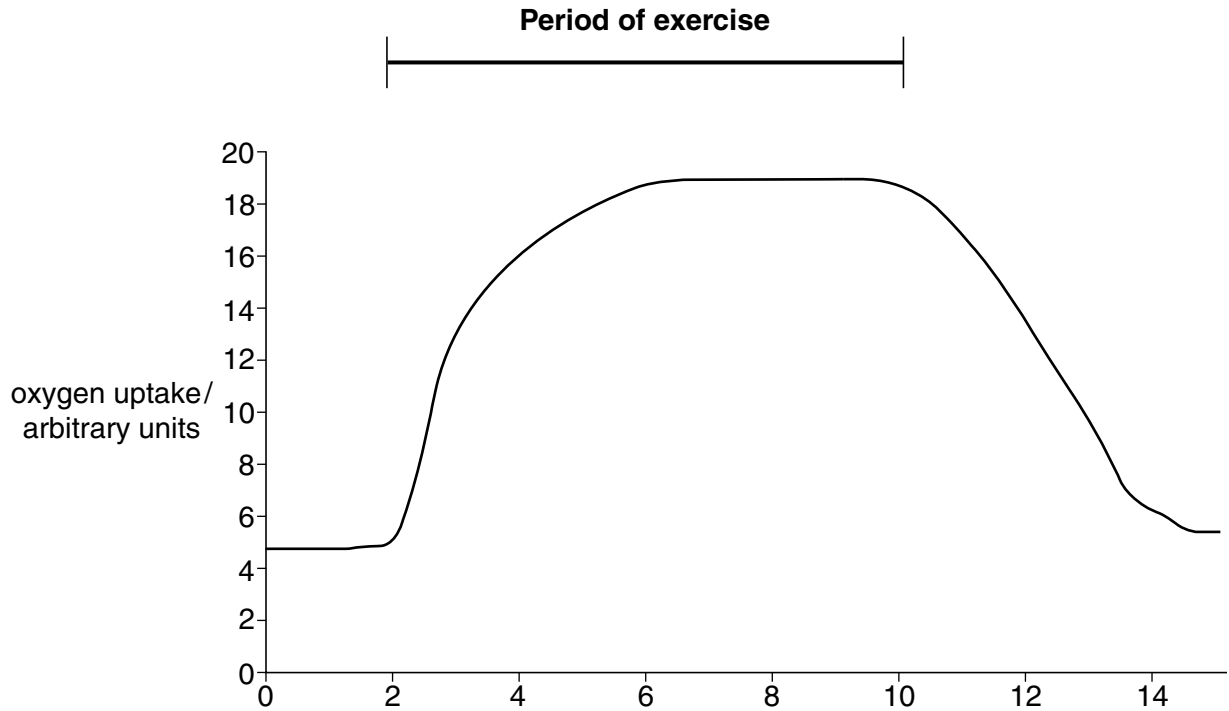


Fig. 6.1

- (a) Explain why the athlete’s oxygen consumption increased between two minutes and six minutes.

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.....[2]

- (b)** Explain why the athlete's oxygen consumption took more than four minutes to decrease to resting values after the end of exercise.

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.....[4]

- (c)** Heart transplants and coronary by-pass surgery are used in the treatment of heart disease.

State two reasons why heart transplants are much less common than coronary by-pass surgery in the treatment of heart disease.

1 .....  
.....  
2 .....  
.....[2]

[Total: 8]