

4: Respiration and the human transport system – Topic questions **Paper 3**

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
4	2016	November	31
5	2016	June	32
5	2016	November	32

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

4 The body has defences against pathogens.

(a) (i) Define the term *pathogen*.

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

(ii) State **two** ways a pathogen can be transmitted.

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

(iii) The body can defend itself against pathogens.

Complete Table 4.1 by stating examples of the body's defences.

Table 4.1

defence	example
mechanical barrier	
chemical barrier	

[2]

(b) (i) Blood cells can also defend the body against pathogens.

Outline how they do this.

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

(ii) State **one** way in which modern medicine can help the body defend itself against pathogens.

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

[Total: 9]

5 Fig. 5.1 shows the risk of coronary heart disease by age and gender.

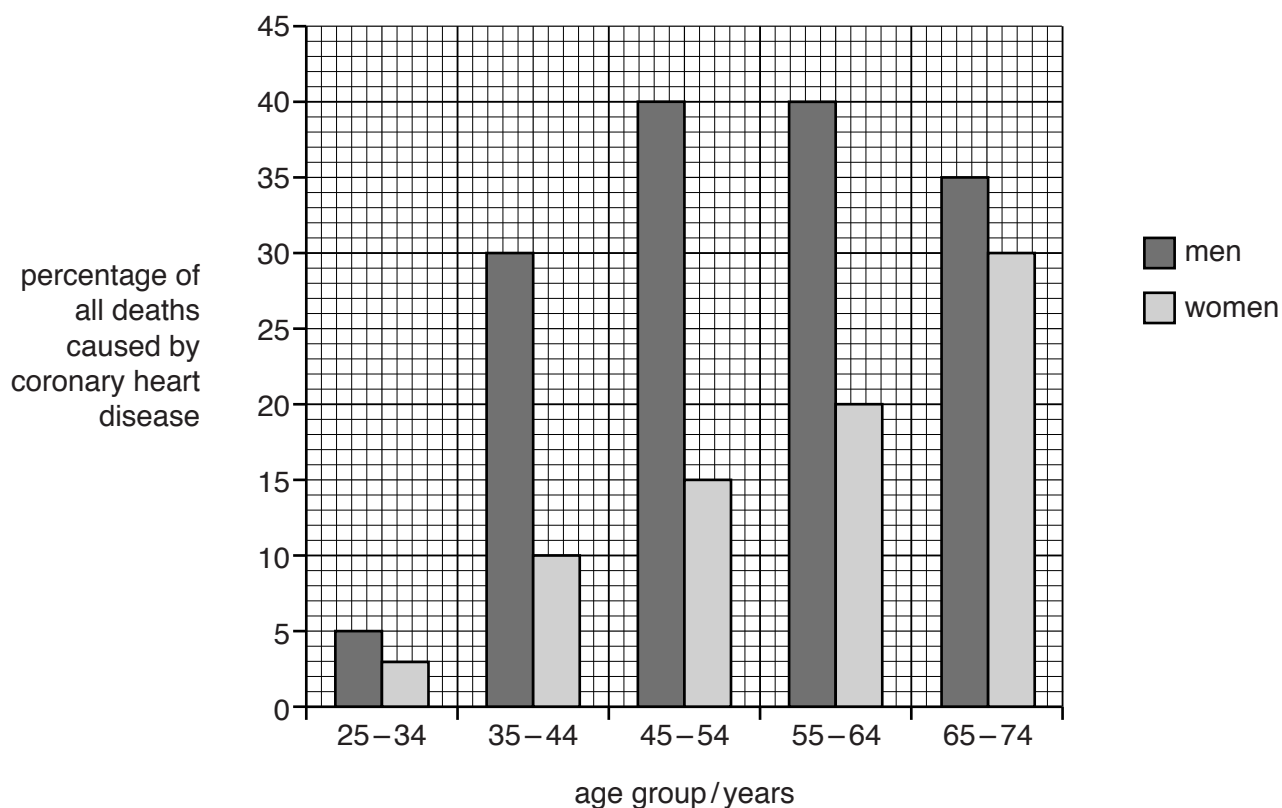


Fig. 5.1

(a) Use Fig. 5.1 to:

- (i)** state which age group has the lowest percentage of deaths caused by coronary heart disease

.....[1]

- (ii)** describe what happens to the risk of coronary heart disease as a man gets older

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

- (iii) describe the difference in risk of coronary heart disease for a man and a woman between the ages of 55 and 64.

.....

.....

.....

.....

.....[2]

- (b) State **three** risk factors for coronary heart disease, **other than** age and gender.

1

2

3[3]

- (c) Fig. 5.2 shows a diagram of the human heart and its associated blood vessels.

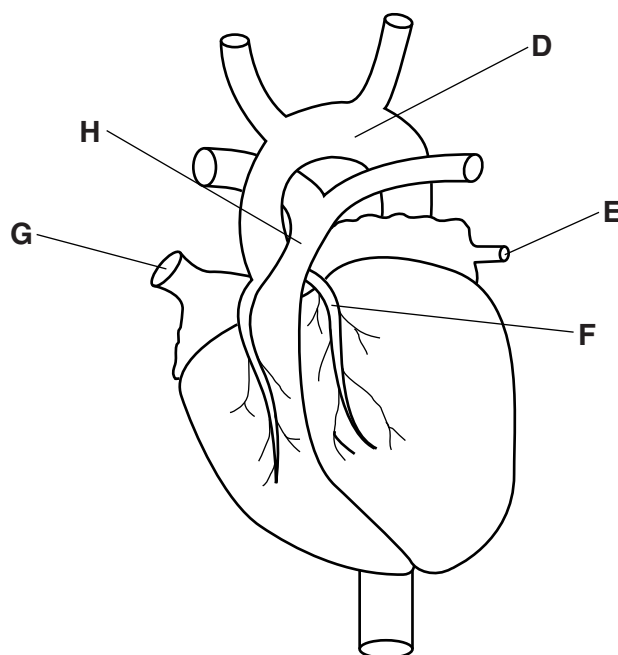


Fig. 5.2

On the diagram, **circle** the letter of the blood vessel which, when blocked, results in coronary heart disease. [1]

(d) The activity of the heart can be studied by monitoring the closing of the heart valves.

(i) Describe how this monitoring could be carried out.

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

(ii) State the function of the heart valves.

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

Fig. 5.3 shows heart activity (valves closing) over a period of ten seconds, for a person who is resting.

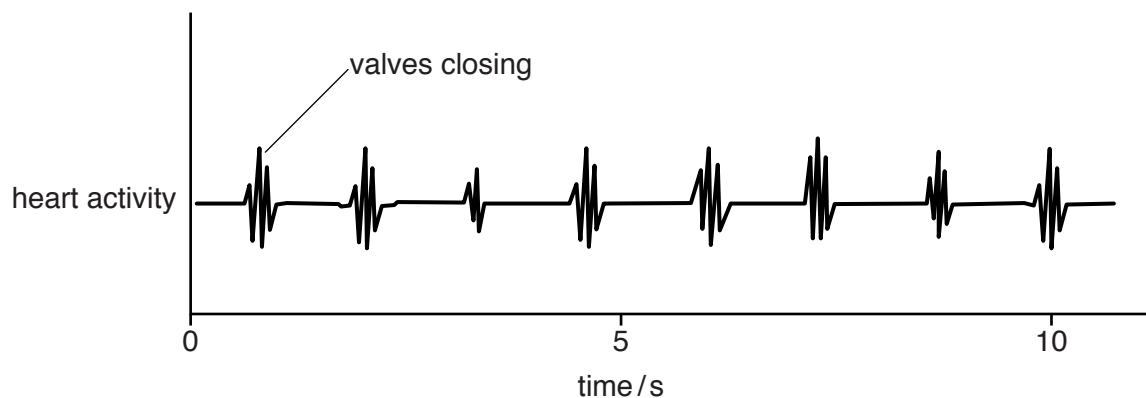


Fig. 5.3

(iii) State how many times the valves close in ten seconds.

.....[1]

(iv) Calculate the heart rate, in **beats per minute**, of the person being monitored. Show your working.

.....beats per minute [2]

(v) Suggest how the heart activity would be different if the person started to exercise.

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

[Total: 15]

- 5 (a) Fig. 5.1 shows the human breathing system.

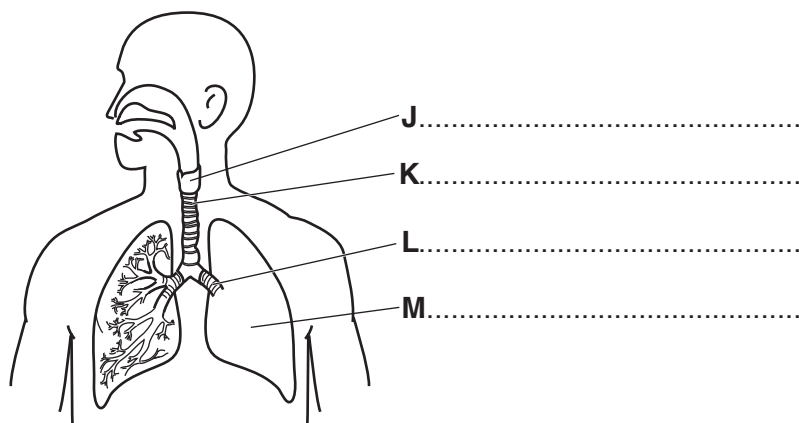


Fig. 5.1

Name the structures labelled J, K, L and M.

Write your answers on Fig. 5.1.

[4]

- (b) Fig. 5.2 shows four sections through groups of alveoli and their blood capillaries.

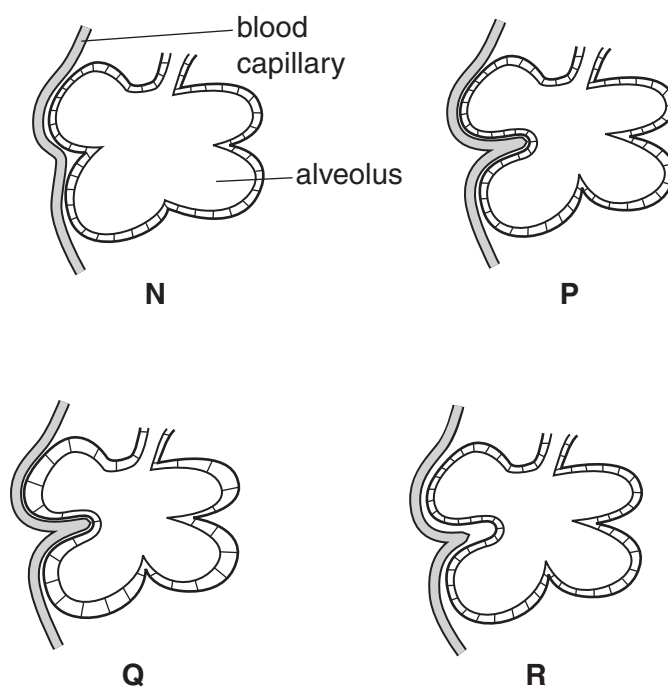


Fig. 5.2

State which diagram, N, P, Q or R, shows the most efficient gas exchange surface.

Give **one** reason for your answer.

most efficient gas exchange surface

reason

.....

[2]

(c) (i) State the word equation for aerobic respiration in cells.

..... + → + [2]

(ii) Respiration releases energy.

Outline **three** uses of this energy in the human body.

- 1
.....
- 2
.....
- 3
.....
- [3]

[Total: 11]

Abbreviations used in the Mark Scheme:

;	separates marking points
/	alternatives
I	ignore
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
AW	alternative wording (where responses vary more than usual)
AVP	any valid point
ecf	credit a correct statement / calculation that follows a previous wrong response
ora	or reverse argument
()	the word / phrase in brackets is not required, but sets the context
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given

Question	Answer	Marks
4 (a) (i)	disease-causing organism;	[1]
4 a (ii)	(direct) contact / through blood / through (named) body fluids; (contaminated) surfaces /AW; (contaminated) food / water / AW; from, animals / (named) vector; through the air/AW;	[2]
4 a (iii)	<i>mechanical</i> skin/ hairs in nose; <i>chemical</i> mucus / stomach or hydrochloric acid / gastric juices;	[2]
4 (b) (i)	ref. to white blood cells; phagocytosis /engulfing /description of engulfing; ref. to production of antibodies / causing cells to clump / stick to cell surface AW;	[3]
4 (b) (ii)	vaccination /antibiotics /antifungals / antivirals /antitoxin / antiseptics /AVP;	[1]
		[Total: 9]

Question	Answer	Marks
5 (a) (i)	<u>25–34</u>	[1]
5 (a) (ii)	increases (with age) ; plateaus between 45–64 ; then falls (at/ after 65) ;	[max 2]
5 (a) (iii)	higher risk for men ; men twice as high as women / 40% for men and 20% for women / difference is 20% ;	[2]
5 (b)	(R age / gender) diet qualified ; (qualification must be a factor that leads to CHD; A obesity) stress ; smoking/ tobacco ; genetic predisposition ; AVP ;	[max 3]
5 (c)	F ;	[1]
5 (d) (i)	listening to (heart sounds) ;	[1]
5 (d) (ii)	prevents blood flowing backwards /AW ;	[1]
5 (d) (iii)	<u>8</u> (times) ;	[1]
5 (d) (iv)	8 × 6 = 48 ;	[2]
5 (d) (v)	<i>idea of</i> heart beats / pulse rate faster, more frequent / more peaks / peaks closer together;	[1]
[Total: 15]		

Question	Answer	Marks
5 (a)	<p><i>J</i> – larynx; <i>K</i> – trachea; <i>L</i> – bronchus; <i>M</i> – lung;</p>	[4]
5 (b)	<p><u>P</u>; <i>idea of:</i> large(r) surface area (than N)/ alveolar wall is thin(ner)/ small diffusion distance / blood vessel closer to alveolar wall (than R or N)/ more rapid diffusion of gases / thin(ner) or smaller cells than Q;</p>	<p>[1]</p> <p>[1]</p>
5 (c) (i)	<p>oxygen and glucose (on LHS); water and carbon dioxide (on RHS);</p>	[2]
5 (c) (ii)	<p><i>energy needed for:</i> 1 contraction of muscle fibres / body movement; 2 (examples of) chemicals reactions; 3 cell division / growth /repair; 4 passage of nerve impulses; 5 brain activity; 6 maintenance of constant body temperature; 7 reproduction / embryo development; 8 digestion; 9 excretion; 10 AVP;</p>	[3]
[Total: 11]		