

**4: Respiration and the human transport system – Topic questions** **Paper 5**

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
2	2016	November	52

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](http://www.cambridgeinternational.org/support)

- 2 (a) A group of students investigated the effect of two different exercises on the heart rate of ten male and ten female students.

Before the first exercise, the pulse rate at rest was measured and the group then jumped on the same spot for two minutes without moving their arms. Every two seconds an investigator shouted 'jump'.

After two minutes the pulse rate was measured and the students were allowed ten minutes to rest.

Before the second exercise, the pulse rate at rest was measured again and the group was asked to do a different exercise.

The students jumped on the same spot for two minutes lifting their arms above their head as they jumped up and dropping their arms as they came down. Every two seconds an investigator shouted 'jump'.

Table 2.1 shows the results of this investigation.

**Table 2.1**

activity	average pulse rate/beats per minute		
	male students	female students	all students
resting	68	74	71
after jumping	96	92	
after jumping and moving arms	128	140	

- (i) Complete Table 2.1 by writing in the average pulse rate for all students after both forms of exercise.

[2]

- (ii) Describe **two** variables in this investigation that have been controlled.

1 .....

.....

2 .....

.....

[2]

- (iii) Explain why the students had to rest before carrying out the second exercise.

.....

.....[1]

- (iv) State **one** variable that cannot be controlled during the exercise and describe the effect of this variable on the results of the investigation.

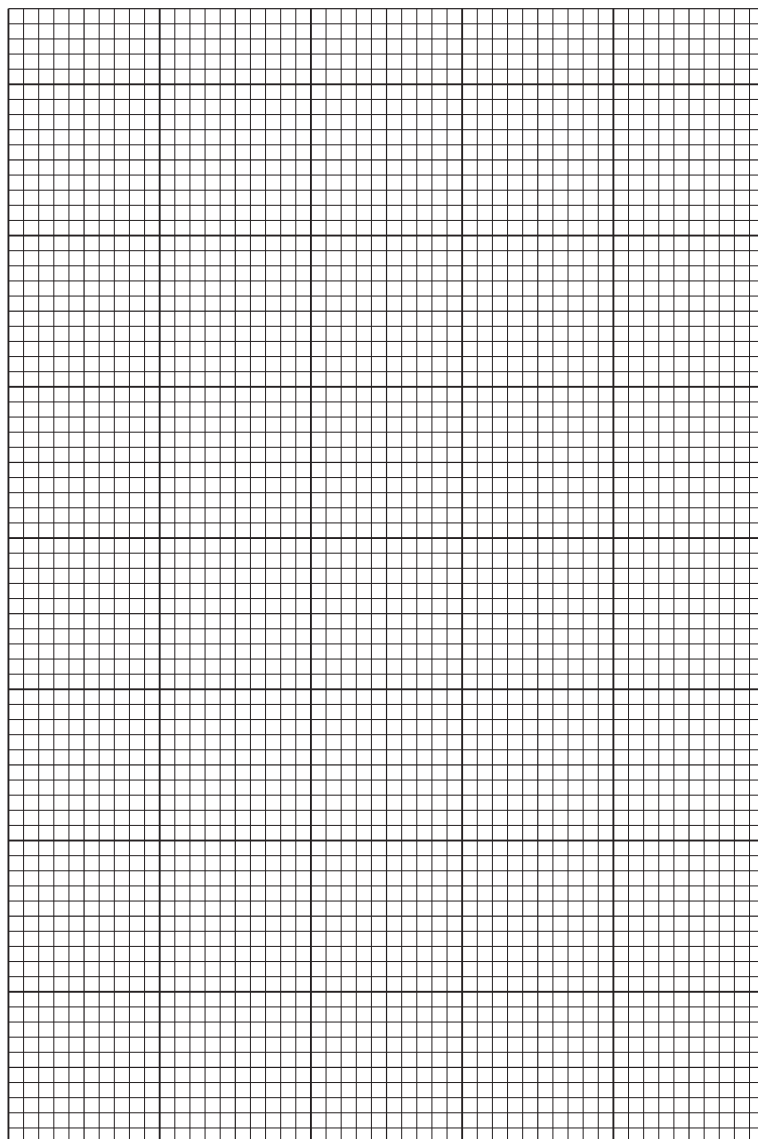
variable .....

effect on results .....

.....

.....

- (b) (i) Plot a bar chart of the data in Table 2.1, for both the male and the female students, on the grid.



[4]

- (ii) State **one** similarity and **one** difference the effect of exercise has on males and females.

similarity .....

.....

.....

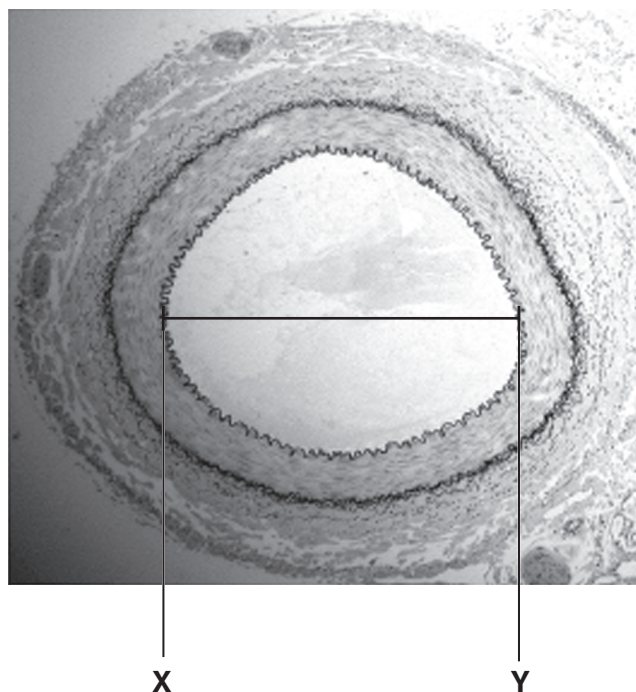
difference .....

.....

.....

[2]

(c) Fig. 2.1 shows a photomicrograph of a cross section of an artery from a mammal.



**Fig. 2.1**

- (i) Make a large diagram of this cross section to show the layers forming the wall of the artery.

- (ii) Measure the diameter of the lumen of the artery between points **X** and **Y** on Fig. 2.1.  
**Include the unit.**

Diameter of the lumen on Fig. 2.1 .....

Draw a line in the same position on your drawing and measure the diameter of the lumen on your drawing.

Diameter of the lumen on your drawing .....

$$\text{magnification} = \frac{\text{diameter of the lumen on your drawing}}{\text{diameter of the lumen on Fig. 2.1}}$$

Calculate the magnification of your drawing using the equation given and your answers.

Show your working.

magnification .....  
[3]

**[Total: 19]**

### 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						
2 (a) (i)	94; 134;	[2]						
2 (a) (ii)	same time / 2 minutes for whole exercise; same time / 10 minutes for rest between exercises; same rate / every 2 sec for each jump; equal numbers of male and female students; idea of same students in each exercise;	[2]						
2 (a) (iii)	to allow pulse rate to recover / return to normal / resting (before doing another exercise); so the effect of the two exercises can be compared;	[1]						
2 (a) (iv)	<table><tr><th>variable</th><th>effect on results</th></tr><tr><td>idea of effort put into exercise;</td><td>more effort would make pulse rate increase more;</td></tr><tr><td>idea of fitness;</td><td>pulse would increase less for fitter students;</td></tr></table>	variable	effect on results	idea of effort put into exercise;	more effort would make pulse rate increase more;	idea of fitness;	pulse would increase less for fitter students;	[2]
variable	effect on results							
idea of effort put into exercise;	more effort would make pulse rate increase more;							
idea of fitness;	pulse would increase less for fitter students;							
2 (b) (i)	correct reading from the graph (2.3 and 0.8) ; $2.3 / 0.8 = 2.9$ ;	[2]						

Question	Answer	Marks
2 (b) (ii)	<p><i>any 1 of:</i></p> <p>(s) exercise increases heart / pulse rate;</p> <p>(s) idea that the more intense the exercise the more increase in heart / pulse rate;</p> <p><i>any 1 from</i></p> <p>(d) jumping without moving arms shows greater increase in males than females;</p> <p>(d) jumping and moving arms shows greater increase in females than males;</p>	[2]
2 (c) (i)	<p><i>drawing of cross section of artery</i></p> <p><b>O</b>(utline) – single clear lines and without shading;</p> <p><b>S</b>(ize) – occupies at least half of the space provided;</p> <p><b>D</b> (etail) to show at least 2 layers and wavy lining;</p>	[3]
2 (c) (ii)	<p>diameter of lumen = 47 (<math>\pm 1</math>) mm;</p> <p>diameter of drawing = <math>X \pm 1</math> mm;</p> <p>correct magnification;</p>	[3]
[Total: 19]		