

Past-paper walk-through

Circulatory systems ■ 9.1

eXercise

Questions in this set

- 0610/21 N25 Q15 ■ 1 mark
- 0610/41 N25 Q2 ■ 15 marks
- 0610/21 J25 Q15 ■ 1 mark
- 0610/22 J25 Q16 ■ 1 mark

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 15

0610/21 N25 ▪ Q15 ▪ 1 mark

15 Which statement describes a double circulatory system?

- A** Blood goes through the lungs twice every time it goes round the body.
- B** Blood goes through the kidneys twice every time it goes round the body.
- C** Blood goes through the heart twice every time it goes round the body.
- D** Blood goes through the brain twice every time it goes round the body.

Solution 15

Answer: **C**

Why

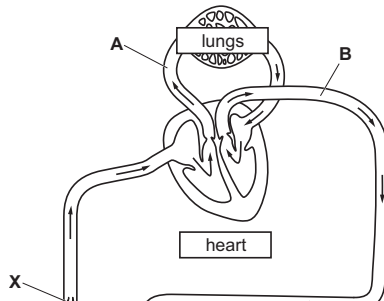
- In a double circulation the blood passes through the *heart* twice for each complete circuit.
- One loop goes to the lungs and back; the other goes to the body and back.
- So the blood is re-pressurised between the two loops.

Question 2

0610/41 N25 ■ Q2 ■ 15 marks

- 2 (a) Fig. 2.1 is a diagram of part of the human circulatory system.

The arrows show the direction of blood flow.



Question 2

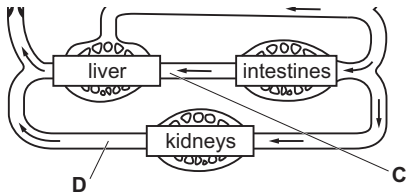


Fig. 2.1

- (i) Complete Table 2.1 by naming the blood vessels in Fig. 2.1 and stating whether the blood in each vessel is oxygenated.

Table 2.1

letter in Fig. 2.1	name of the blood vessel	carries oxygenated blood (yes/no)

Question 2

A		
B		
C		
D		

[4]

- (ii) State the name of structure **X** in Fig. 2.1 and outline its function.

Question 2

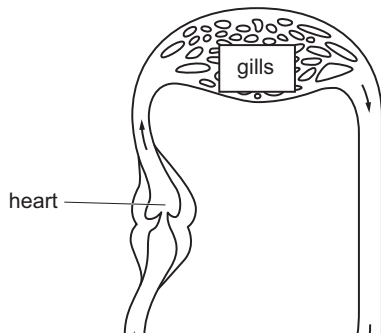
Question 2

Question 2

[2]

(b) Fig. 2.2 is a diagram of part of a fish circulatory system.

The arrows show the direction of blood flow.



Question 2

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Question 2



Fig. 2.2

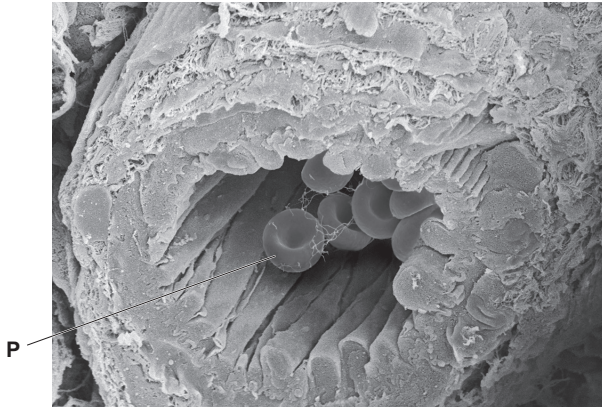
- (i) Describe how the structure of the fish heart in Fig. 2.2 differs from a human heart.

Question 2

- (ii) Explain the advantages of the type of circulatory system found in humans, compared with the circulatory system shown in Fig. 2.2.

Question 2

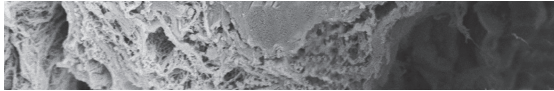
(c) Fig. 2.3 is a photomicrograph of an arteriole.



Question 2



Question 2



magnification $\times 1430$

Fig. 2.3

- (i) Identify the structure labelled **P** in Fig. 2.3.

Question 2

- (ii) The magnification of the image is provided. Write the formula that would be used to calculate the actual diameter of the lumen of the arteriole in Fig. 2.3.

Question 2

(iii) The actual diameter of the lumen of the arteriole shown in Fig. 2.3 is 0.0315 mm.

Convert 0.0315 mm to micrometres (μm).

Question 2

[Total:15]

Solution 2

(a)(i) Mark scheme

- letter on Fig. 6.1 name of the blood
- vessel
- carries
- oxygenated blood
- A
- pulmonary artery
- no
- B

Solution 2

- aorta
- yes
- C
- hepatic portal vein no
- D
- renal vein
- no
- ;;;
- 4 one mark for each correct row

Solution 2

(a)(ii)

Mark scheme

- name: valve ;
- function: prevents back flow of blood / AW ;
- 2

Solution 2

(b)(i) Mark scheme

- any two from:
- (only) two chambers ;
- no, septum / left and right sides / AW ;
- fewer valves ;
- heart (chamber) walls of similar thickness (to each other) ;
- fewer blood vessels (going to and from the heart) ;
- 2 ora throughout
- 0610/41

Solution 2

- October/November 2025
- Guidance

Solution 2

(b)(ii) Mark scheme

- any four from:
 - 1
 - blood is pumped to the lungs then to the body / blood goes through
 - the heart twice in one complete journey / double circulation ;
 - 2
 - oxygenated and deoxygenated blood, are kept separate / do not
 - mix / separated by septum ;
 - 3

Solution 2

- efficient, supply of blood / glucose / oxygen / nutrients (to, the
- body / AW) ;
- 4
- efficient, removal / carbon dioxide / urea / lactic acid (from, body / AW);
- 5
- provides high(er) pressure (in body) ;
- 6
- which allow a high, metabolic rate / rate of respiration ;
- 7
- which allows filtration in kidneys (for excretion) ;

Solution 2

- 8
- low(er) pressure in, pulmonary, artery / circuit / AW ;
- 9
- to prevent damage to (capillaries in the) lungs ;
- 10 allow more time for, gas exchange / absorption of oxygen ;
- 11 AVP ;
- 4
- e.g. larger / steeper, diffusion gradient
- between capillaries and respiring
- tissues / allows large body size / maintenance

Solution 2

- of body temperature

Solution 2

(c)(i)

Mark scheme

- red blood cell ;
- 1

(c)(ii)

Mark scheme

- actual size = image size $\div$ magnification ;
- 1

Solution 2

(c)(iii)

Mark scheme

- 31.5 (μm) ;
- 1
- 0610/41
- October/November 2025
- Guidance

Question 15

0610/21 J25 ■ Q15 ■ 1 mark

15 In a fish, what is the sequence of structures that blood passes through after it leaves the heart?

- A** gills → muscles → heart
- B** gills → heart → muscles → heart
- C** muscles → gills → heart
- D** muscles → heart

Solution 15

Answer: **A**

Why

- A fish has a single circulation: blood passes through the heart once per circuit.
- It leaves the heart, goes to the gills to be oxygenated, then on to the body.
- From the body it returns to the heart, so the sequence is gills, then body, then heart.

Question 16

0610/22 J25 ■ Q16 ■ 1 mark

- 16** What is an advantage of a double circulatory system?
- A** It allows the mixing of oxygenated and deoxygenated blood.
 - B** It can keep blood pressure high in the lungs.
 - C** Less carbon dioxide is removed from the body cells.
 - D** Oxygen is supplied to body cells by blood at high pressure.

Solution 16

Answer: **D**

Why

- In a double circulation the blood passes through the heart twice per circuit.
- The heart re-pressurises the blood after the lungs, before sending it to the body.
- So the body receives blood at high pressure while the delicate lungs get it at low pressure.