

# Transport in animals

## Question Paper 2

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Exchange and transport
Topic	Transport in animals
Booklet	Question Paper 2

**Time allowed:** 57 minutes

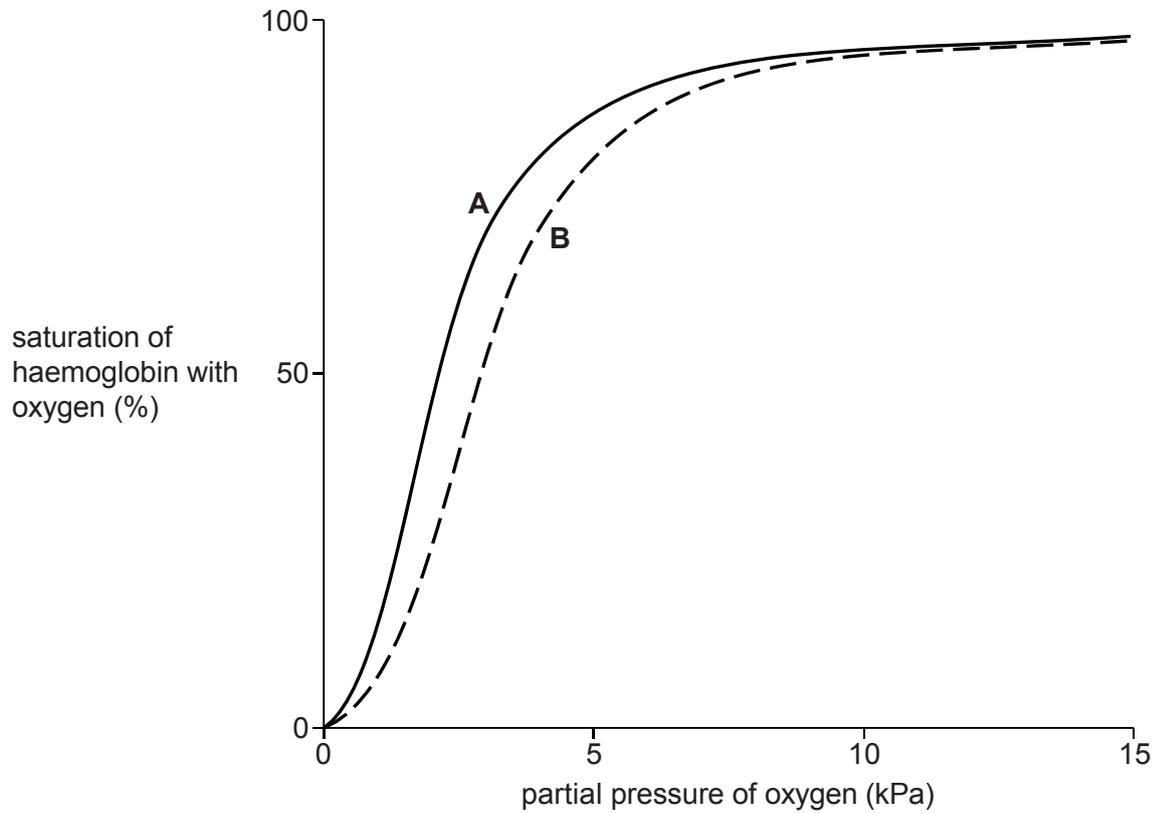
**Score:** /42

**Percentage:** /100

### Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Fig. 4.1 shows the oxygen dissociation curves for fetal haemoglobin (**A**) and adult haemoglobin (**B**).



**Fig. 4.1**

(a) (i) Curve **A** represents fetal haemoglobin.

Explain why the fetal haemoglobin curve is to the left of the adult haemoglobin curve.

[3]

- (ii) Sickle cell anaemia is an inherited disorder in which haemoglobin crystallises when the partial pressure of oxygen ( $pO_2$ ) is low. The red blood cells change shape and oxygen transport is disrupted.

Treatment with drugs, such as hydroxyurea, can stimulate adults to produce fetal haemoglobin rather than adult haemoglobin.

Suggest why this treatment might be of benefit to adults with sickle cell anaemia. [2]

- (b) Describe **and** explain how substances that are dissolved in the blood plasma, such as oxygen or glucose, **enter the tissue fluid** from the capillaries.

*In your answer you should use appropriate technical terms, spelled correctly.*

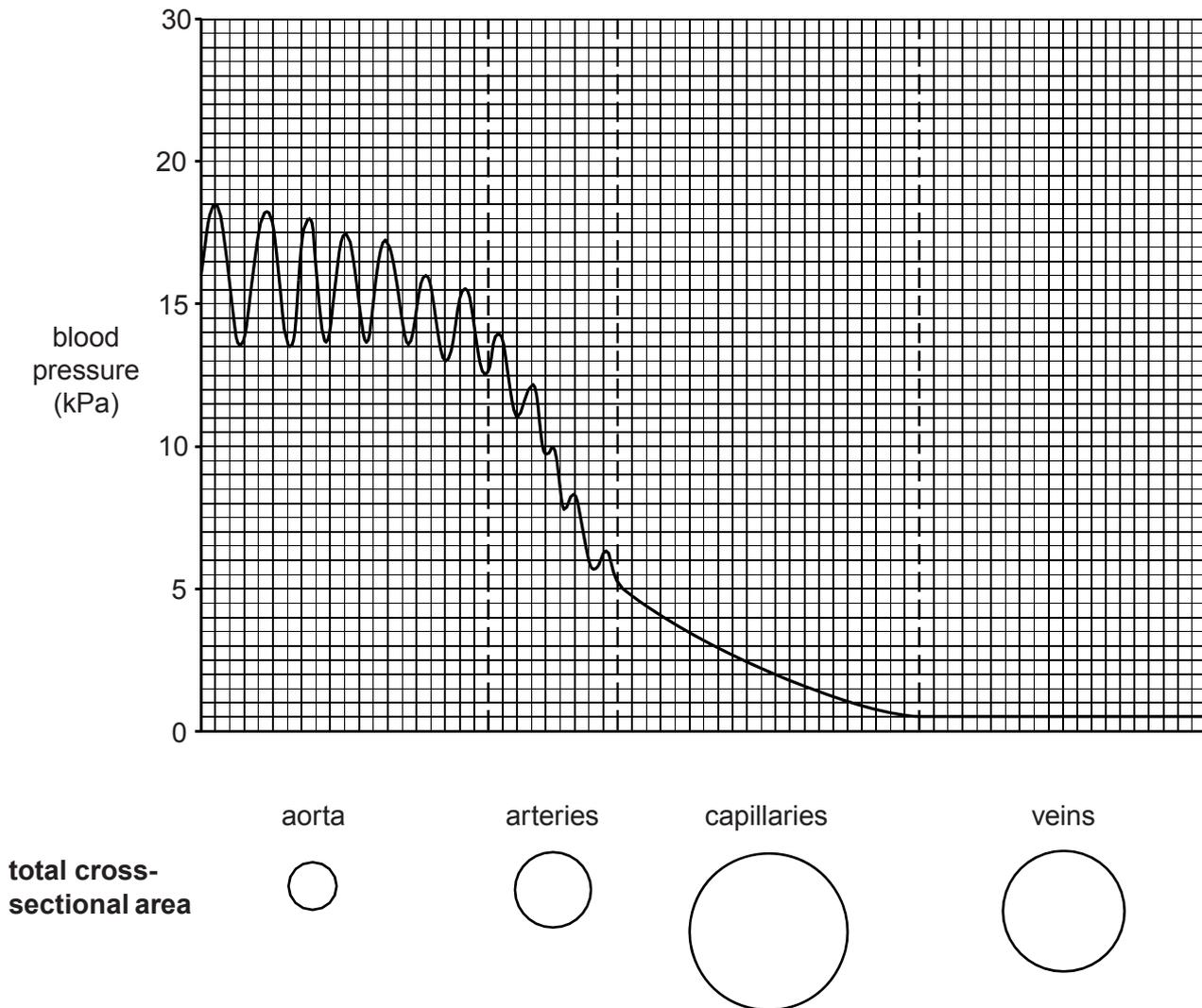
[4]

[Total: 9]

## Question 2

Fig. 3.1 provides information about the blood pressure in different parts of the mammalian blood circulatory system.

Fig. 3.1 also shows the **total** cross-sectional area of the vessels, relative to one another, in parts of the blood circulatory system.



**Fig. 3.1**

(a) Place a tick (✓) in the box below that most closely describes the mammalian blood circulatory system.

[1]

	open circulatory system	closed circulatory system
single circulatory system		
double circulatory system		

- (b)** The pressure fluctuates as the blood flows along the aorta, as shown in Fig. 3.1.
- (i)** Explain what causes this fluctuation. **[2]**
- (ii)** State the term used to describe the number of fluctuations per minute. **[1]**
- (c)** Using the information in Fig. 3.1, describe the pressure changes in the blood as it flows through the circulatory system from the aorta to the veins. **[3]**
- (d) (i)** Using the information in Fig. 3.1, explain what causes the overall change in pressure as blood flows from the aorta to the arteries and from the arteries to the capillaries. **[2]**
- (ii)** Explain why it is important that the pressure changes as blood flows from the aorta to the capillaries. **[2]**

**[Total: 11]**

### Question 3

Three examples of fluids in the mammalian body are blood, tissue fluid and lymph.

- (a) Complete Table 3.1 below comparing different features of arterial blood, tissue fluid and lymph.

[4]

**Table 3.1**

feature	arterial blood	tissue fluid	lymph
hydrostatic pressure		low	
presence of large proteins	yes		
presence of neutrophils	yes		
presence of erythrocytes			no

- (b) In a closed circulatory system, blood is kept inside blood vessels.

- (i) Suggest **two** advantages of keeping the blood inside vessels.

[2]

- (ii) Describe **and** explain how the wall of an artery is adapted both to withstand and maintain high hydrostatic pressure.

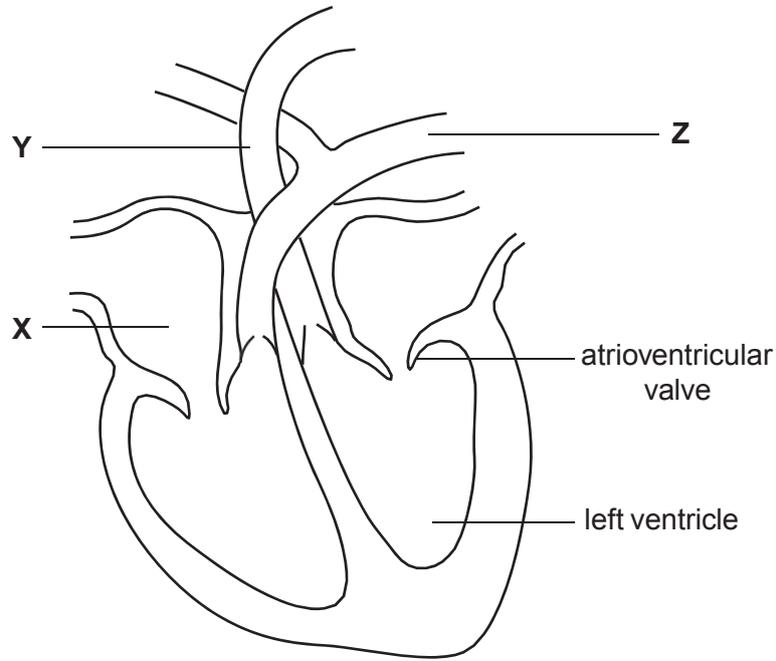
[5]

[Total: 11]

## Question 4

Large animals, such as mammals, need efficient transport systems.

(a) Fig. 3.1 shows a section through the mammalian heart.



**Fig. 3.1**

(i) Name the parts labelled **X**, **Y** and **Z**. **[3]**

**X**

**Y**

**Z**

(ii) Explain why the wall of the left ventricle is thicker than the wall of the left atrium. **[3]**

(iii) Explain how pressure changes in the heart bring about the closure of the atrioventricular (bicuspid) valve.

[2]

(b) The mammalian transport system is a double circulatory system.

An efficient circulatory system consists of a pump, a means of maintaining pressure, a transport medium and exchange surfaces.

State the component of the **mammalian circulatory system** that fulfils each of these roles.

The first one has been done for you.

[3]

- pump ..... h e a r t .....
- means of maintaining pressure .....
- transport medium .....
- exchange surface .....

[Total: 11]