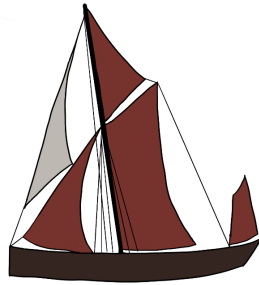

AQA CIRCULATION SYSTEM MARK SCHEME

Science Exams Sorted



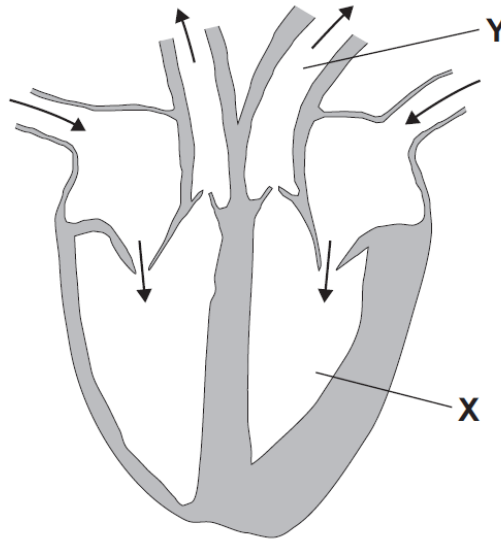
2021

www.scienceexamssorted.co.uk

AQA Circulation System Mark Scheme

1. Each year people need to have treatment for heart problems.

The figure below shows a human heart.



- a. Name part X in the figure above.

<u>Left</u> ventricle	(1)
	Total: 1 mark

- b. Name part Y in the figure above.

Aorta	(1)
	Total: 1 mark

- c. There are valves inside the heart.

What is the function of these valves?

Prevent backflow (of blood)	(1)
	Total: 1 mark

- d. Some patients need to have their heart valves replaced.

Table 1 shows the percentage of patients who died from different causes after having heart valve replacements.

Two types of heart valve were used:

- **mechanical** – made of metal and plastic
- **pig tissue** – made from pig heart tissue on a metal frame.

AQA Circulation System Mark Scheme

The data was collected over 15 years and 400 patients were involved.

Use information from the table above and your own knowledge to answer the following question.

A patient decides to have a mechanical valve replacement rather than a pig tissue valve replacement. Suggest reasons for and against choosing a mechanical valve.

Reasons for: any two of the following	
<ul style="list-style-type: none"> • Less likely to die (44% cf. 59%) • Lower risk of death from having a second operation • Lower risk of heart infections • Less chance of the valve stopping working • Longer lasting • Doesn't cause rejection • Avoids religious issues of using organs from a pig or no • Ethical issue from using part of a living organism. 	(2)
Reasons against: any two of the following	
<ul style="list-style-type: none"> • Chance of death by bleeding is increased • Offers no advantage against clots or equal risk of blood clots • have to take anti-clotting drugs for life • can be noisy. 	(2)
Max 3 marks if only reasons for or reasons against given.	
	Total: 4 marks

e. Some people have narrowed arteries.

Describe how stents can be used to prevent a heart attack in a person with narrowed arteries.

(inserted to) keep the (coronary) artery / arteries open	(1)
Allows more blood to flow (to the heart muscle) or return blood flow to normal.	(1)
	Total: 2 marks

AQA 2017 Higher Paper 3 Q2

AQA Circulation System Mark Scheme

2. The circulatory system is composed of the blood, blood vessels and the heart.

Urea is transported in the blood plasma.

a. Name two other substances transported in the blood plasma.

Any two from:	
Carbon dioxide	(1)
Water	(1)
Glucose	(1)
Amino acids	(1)
Lactic acid	(1)
	Total: 2 marks

b. Some athletes train at high altitude.

Training at high altitude increases the number of red blood cells per cm³ of blood.

Explain why having more red blood cells per cm³ of blood is an advantage to an athlete.

More haemoglobin.	(1)
<u>(therefore) more oxygen can be carried / transported.</u>	(1)
<u>(for) more (aerobic) respiration of muscle (cells).</u>	(1)
<u>Accept more energy released for muscle (cells).</u>	
	Total: 3 marks

c. Which two blood vessels carry deoxygenated blood? Tick two boxes.

Pulmonary artery	(1)
Vena cava	(1)
	Total: 2 marks

d. The figure below shows the three types of blood vessel.

Which type of blood vessel carries blood into the right atrium?

Tick one box.

B	(1)
	Total: 1 mark

AQA Circulation System Mark Scheme

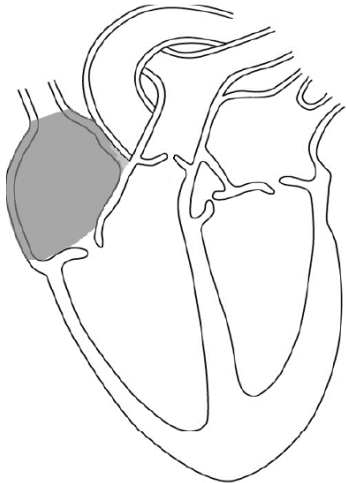
e. Compare the structure of an artery with the structure of a vein.

Any three from:	
Arteries have a thicker layer of muscle (tissue) or veins have a thinner layer of muscle (tissue).	(1)
Arteries have a thicker layer of elastic tissue or veins have a thinner layer of elastic tissue.	(1)
Arteries have a narrower lumen or veins have a wider lumen. Allow descriptions of 'lumen'.	(1)
Arteries do not have valves and veins have valves. Allow only veins have valves	(1)
	Total: 3 marks

f. Heart rate is controlled by a group of cells. This group of cells act as a pacemaker.

The figure below shows a section through the heart.

Draw an X on the figure below to show the position of the pacemaker.

Allow an X drawn anywhere in grey shaded area below:	(1)
	
	Total: 1 mark

g. A patient may be fitted with an artificial pacemaker.

What condition may be treated using an artificial pacemaker?

An irregular heartbeat. Allow arrhythmia. Allow fibrillation.	(1)
	Total: 1 mark

AQA Circulation System Mark Scheme

3. The circulatory system contains arteries and veins.

a. Describe how the structure of an artery is different from the structure of a vein.

Arteries do not have valves.	(1)
Allow veins have valves.	
Arteries have a thicker wall or thicker layer of muscle.	(1)
Allow has a smaller lumen. Ignore references to elastic (in walls).	
	Total: 2 marks

b. A comparison is made between blood taken from an artery in the leg and blood taken from a vein in the leg.

Give two differences in the composition of the blood.

Any two from:	
(artery has) more oxygen	(1)
(artery has) more glucose	(1)
(artery has) less carbon dioxide	(1)
(artery has) less lactic acid	(1)
	Total: 2 marks

c. During operations patients can lose a lot of blood. Patients often need blood transfusions to keep them alive.

The figure below shows information about a new artificial blood product.

Suggest two possible advantages of using the new artificial blood, instead of using human blood for a transfusion in humans.

Any two from:	
No rejection	(1)
Abundant supply	(1)
Low risk of infection	(1)
Longer shelf life	(1)
	Total: 2 marks

AQA Circulation System Mark Scheme

4. The circulatory system transports substances such as glucose and oxygen around the body.

a. Name three other substances that the circulatory system transports around the body.

Any three from:	
Carbon dioxide / CO ₂	(1)
Urea	(1)
Protein	(1)
Water / H ₂ O	(1)
Hormones / insulin	(1)
	Total: 3 marks

b. Blood is a tissue. Blood contains red blood cells and white blood cells.

Name two other components of blood.

Plasma	(1)
Platelets	(1)
	Total: 2 marks

c. The heart is part of the circulatory system.

What type of tissue is the wall of the heart made of?

(cardiac) muscle	(1)
	Total: 1 mark

d. In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate. Every year, many patients need to have heart valve replacements.

The table below gives information about two types of heart valve.

A patient needs a heart valve replacement. A doctor recommends the use of a cow tissue heart valve.

Give the advantages and disadvantages of using a cow tissue heart valve compared with using a living human heart valve.

Use information from the table above and your own knowledge in your answer.

AQA Circulation System Mark Scheme

Marking guidance		
Level	Marks	Descriptor
Level 1	1 - 2	There is a description of at least one advantage of the cow tissue valve.
Level 2	3 - 4	There is a description of at least one advantage of the cow tissue valve.
Level 3	5 - 6	There is a description of the advantages and disadvantages of the cow tissue valve.

A description which includes some of the following points	
<p>Advantages of cow tissue valve:</p> <ul style="list-style-type: none"> • Abundant supply of cows. • No shorter waiting times. • No need for tissue typing. • Quicker operation. • Less invasive or shorter recovery time. • Cheaper operation costs. • Less operation / anaesthetic risks. 	
<p>Disadvantages of cow tissue valve:</p> <ul style="list-style-type: none"> • Made from cow so possible objections on religious grounds. • New procedure so could be unknown risks. • Risks of using a stent e.g. blood clots, stent breaking or valve tearing. • Not proven as a long-term treatment. • May be rejected. 	
	Total: 6 marks

AQA 2015 Higher Paper 3 Q2

5. Blood is part of the circulatory system.
- a. Give one function of white blood cells.

Defence against or destroy pathogens / bacteria / viruses / microorganisms	(1)
	Total: 1 mark

AQA Circulation System Mark Scheme

b. Which of the following is a feature of platelets?

Tick one box.

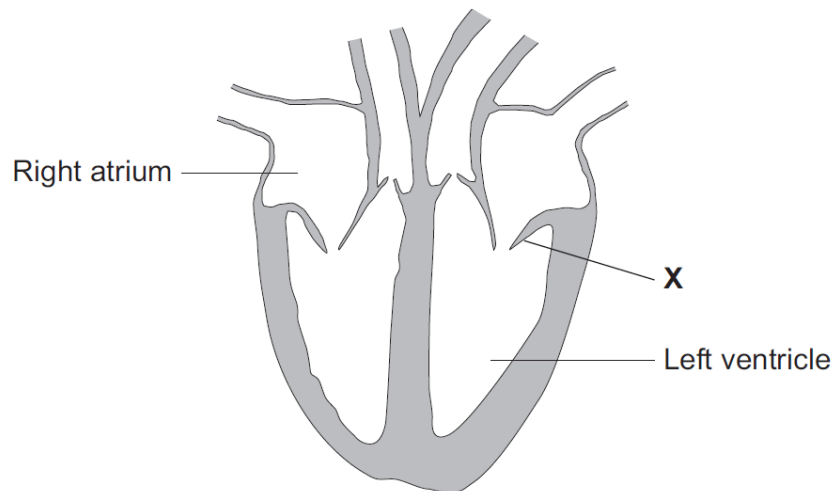
They are small fragments of cells	(1)
	Total: 1 mark

c. Urea is transported by the blood plasma from where it is made to where the urea is excreted.

Complete the following sentence.

liver	(1)
kidney(s)	(1)
In this order only	
	Total: 2 marks

The figure below shows a section through the human heart.



Structure X is a valve. If valve X stops working, it may need to be replaced.

A scientist is designing a new heart valve. The scientist knows that the valve must be the correct size to fit in the heart.

d. Suggest two other factors the scientist needs to consider so that the newly designed valve works effectively in the heart.

AQA Circulation System Mark Scheme

Any three from:	
That it doesn't cause an immune response or isn't rejected / damaged by white blood cells.	(1)
Whether it is a long-lasting material / doesn't decompose / corrode / inert.	(1)
If it is strong (to withstand pressure)	(1)
It will open at the right pressure	(1)
That it doesn't cause clotting	(1)
That it doesn't leak or it prevents backflow	(1)
Non toxic	(1)
	Total: 3 marks

AQA 2014 Higher Paper 3 Q4

6. The heart is part of the circulatory system.

The figure below shows a section through the human heart.

- a. Which arrow, A, B, C or D, shows blood leaving the heart in the pulmonary artery to go to the lungs?

B	(1)
	Total: 1 mark

- b. Which arrow, A, B, C or D, shows blood from the lungs entering the heart in the pulmonary vein?

D	(1)
	Total: 1 mark

- c. Valves in the circulatory system make sure blood only travels in one direction.

Name the type of blood vessel that has valves.

Vein	(1)
	Total: 1 mark

AQA 2014 Foundation Paper 3 Q1 b