This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lebanon Evangelical School
for Boys and Girls Loueizeh - Baabda

SE01 Exam

09NOV2026

Do NOT write in this box. Your MARK will be placed here.

Subject :	A Level : Biology 1
Class :	11A and 12A
Teacher :	Miss Rahmeh Hilal
Duration :	2 hours
You are to answer the questions to this exam on : this exam paper	
Your name :	*Time taken to complete exam*
Your Class :	
Exam Room :	
How many sheets, including cover sheet :	

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Warfarin is an anticoagulant.

The dose of warfarin that is given to a patient has to be monitored regularly. This is done by adding thromboplastin to a blood sample and measuring the time it takes for the blood to clot.

The result is compared with a control sample and is reported as an International Normalised Ratio (INR) level.

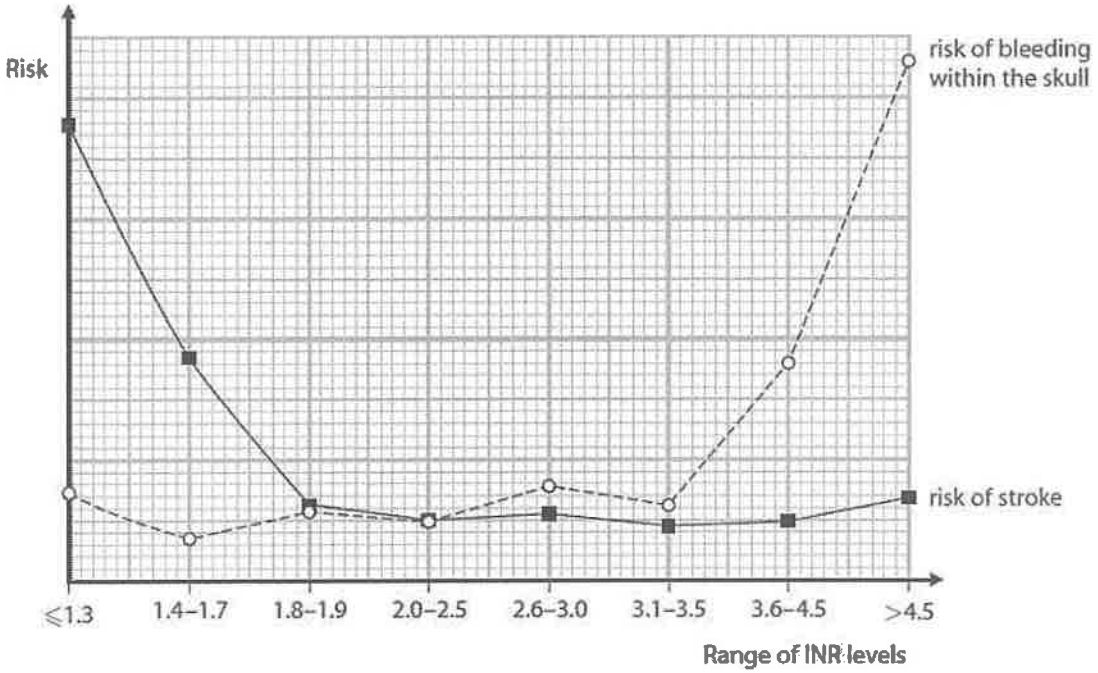
(a) How many of the following statements are correct for thromboplastin?

- it is stored in platelets
- it is an active enzyme
- it is converted into thrombin

(1)

☐ **A** none
☐ **B** one
☐ **C** two
☐ **D** three

(b) The graph shows the relationship between the INR level and the risk of stroke and the risk of bleeding within the skull.



Deduce a safe range for the INR level.
Use the information in the graph to support your answer.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) Explain how taking this anticoagulant can reduce the risk of cardiovascular disease (CVD).

(3)

.....

.....

.....

.....

.....

(d) Warfarin is given to patients who have had a heart attack, to prevent further heart attacks and other related health issues.

A study compared warfarin with the use of aspirin, over a four-year period following the first heart attack.

(i) A group of 1216 were given warfarin; 83.3% of these people had no further health issues. Calculate the number of people given warfarin who had no further health issues following their first heart attack.

(1)

Answer .....

(ii) A second study compared this result with people given a combination of warfarin and aspirin.

Describe how this study should be carried out to produce a valid comparison.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

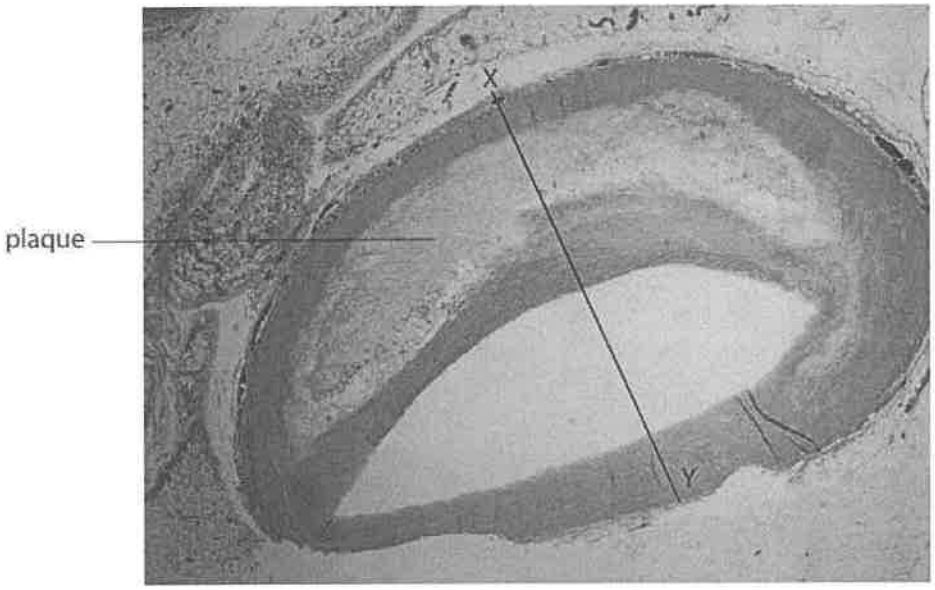
.....

(Total for question 1 = 12 marks)

Q2.

Many studies have linked the development of atherosclerosis with cardiovascular disease (CVD).

(a) The photograph shows a section through an artery with a plaque (atheroma) from a patient with atherosclerosis.



© Ogphoto/iStock

Calculate the percentage increase in the thickness of the artery wall where the plaque is located. Take your measurements along the line labelled X–Y.

(3)

Answer ..... %

(b) Explain how atherosclerosis can result in damage to the heart muscle.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

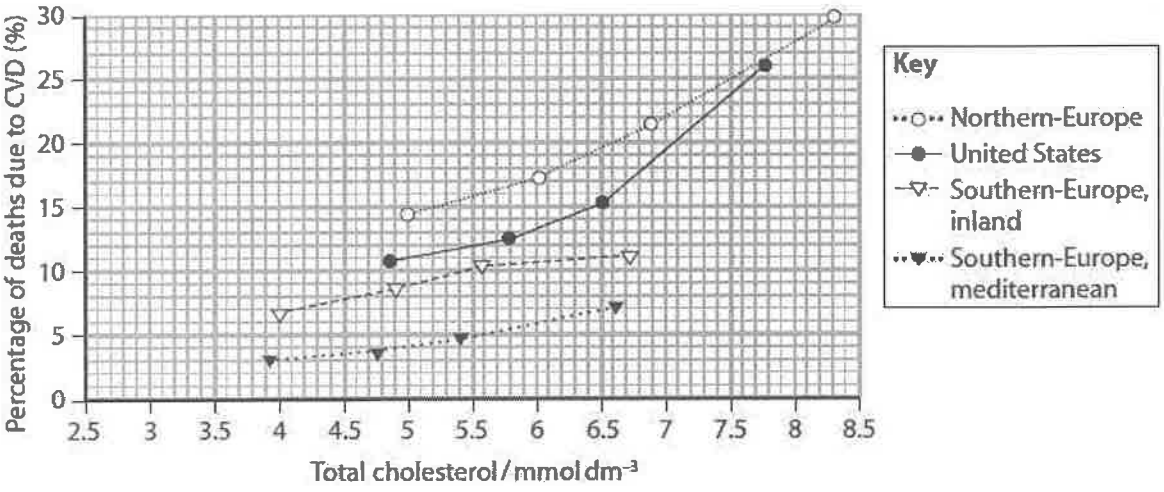
.....

.....

.....

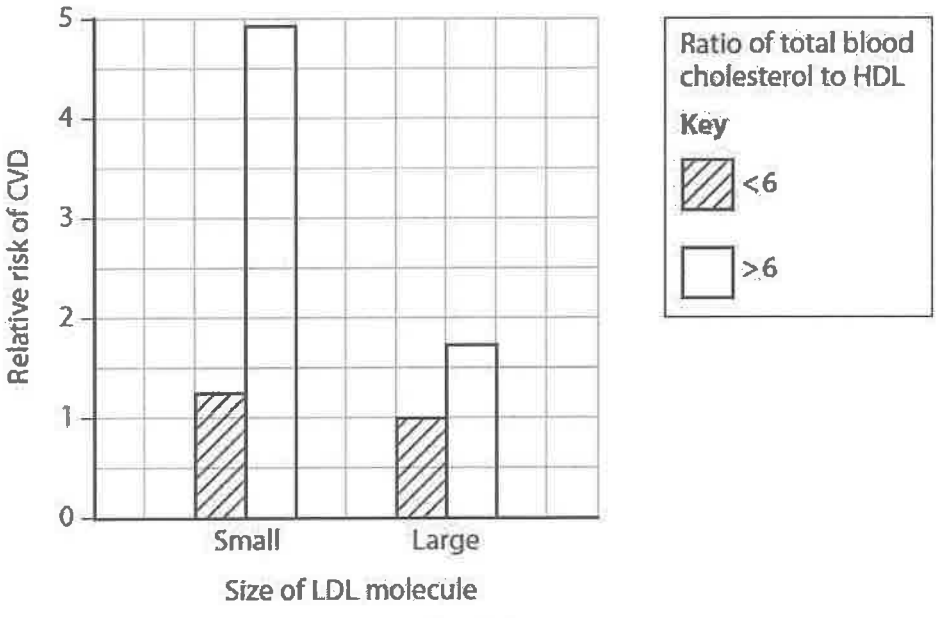
*(c) Cholesterol is transported in the blood as lipoproteins LDL and HDL.

In one study, the relationship between total blood cholesterol and the risk of death from CVD was investigated.
The results are shown in the graph.



Graph 1

In another study, the effect of the size of LDL and the ratio of total blood cholesterol to HDL on the relative risk of CVD was investigated.
The results are shown in the graph.



Graph 2

Assess the contribution of lipoproteins to the risk of developing CVD. Use the information in the graph to support your answer.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question 2 = 13 marks)

Q3.

The blood clotting process has to be fast to prevent loss of blood from wounds.

(a) Which molecule traps red blood cells and platelets in the formation of a blood clot at a wound?

(1)

☒ **A** cholesterol
☒ **B** collagen
☒ **C** fibrin
☒ **D** fibrinogen

(b) How many of the following are converted into an active enzyme during blood clotting?

- Fibrin
- Fibrinogen
- Prothrombin
- Thrombin

(1)

☒ **A** 1
☒ **B** 2
☒ **C** 3
☒ **D** 4

(c) How many of the following are soluble in blood plasma?

- Fibrin
- Fibrinogen
- Prothrombin
- Thrombin

(1)

☒ **A** 1
☒ **B** 2
☒ **C** 3
☒ **D** 4

(d) Thromboplastin is stored inside platelets.

Explain the advantages of storing thromboplastin inside platelets.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question 3 = 6 marks)

Q4.

Many animals have a heart and circulatory system.

(a) Five litres of blood can pass through a human heart each minute.

Calculate the volume of blood that passes through this heart in 24 hours.
Give your answer in standard form.

(2)

Answer ..... litres

(b) Blood leaves the heart through the arteries.

Compare and contrast the structure of the aorta with the structure of the pulmonary artery.

(2)

.....

.....

.....

.....

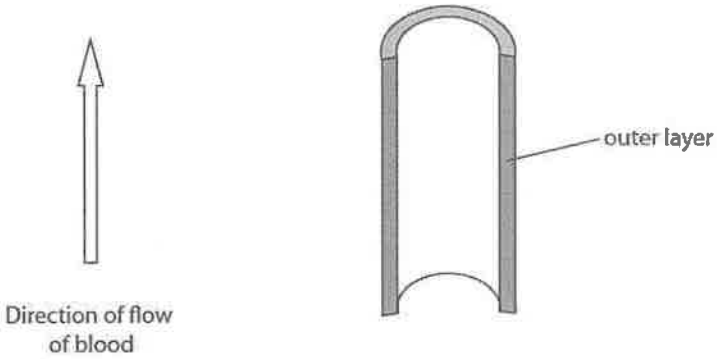
.....

.....

(c) Blood returns to the heart through the veins.

The diagram shows the outline of a vein. The direction of flow of blood is also shown. Complete and label the diagram to show the structures present in a vein.

(3)



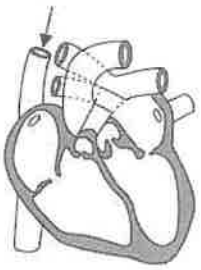
(Total for question 4 = 7 marks)

Q5.

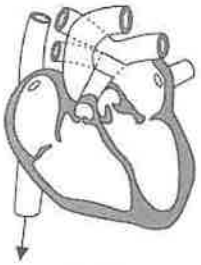
Blood flows through the heart during the cardiac cycle.

(a) Which diagram shows the direction of blood flow through the vena cava?

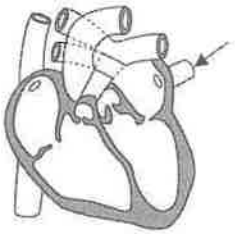
(1)



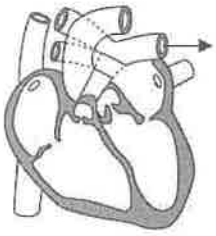
☒ **A**



☒ **C**



☒ **B**



☒ **D**

(b) Which row in the table describes the blood flow through the pulmonary artery and the pulmonary vein?

(1)

	Blood flow through pulmonary artery	Blood flow through pulmonary vein
☒ **A**	deoxygenated blood flowing away from the heart	oxygenated blood flowing towards the heart
☒ **B**	deoxygenated blood flowing towards the heart	oxygenated blood flowing away from the heart
☒ **C**	oxygenated blood flowing away from the heart	deoxygenated blood flowing towards the heart
☒ **D**	oxygenated blood flowing towards the heart	deoxygenated blood flowing away from the heart

(c) The table describes the atrioventricular (AV) valves and the semilunar (SL) valves during the cardiac cycle.

Which description is true for each stage of the cardiac cycle?

(3)

Stage of the cardiac cycle	AV valves open and SL valves open	AV valves open and SL valves closed	AV valves closed and SL valves open	AV valves closed and SL valves closed
atrial systole	☒	☒	☒	☒
ventricular systole	☒	☒	☒	☒
diastole	☒	☒	☒	☒

(d) Describe how the events of the cardiac cycle change when the demand of body cells for oxygen increases.

(2)

.....

.....

.....

.....

.....

.....

(Total for question 5 = 7 marks)

Q6.

The structure of blood vessels relates to their function.

(a) Describe how the structure of capillaries relates to their function.

(2)

.....

.....

.....

.....

.....

.....

(b) Draw a cross-section of an artery to show details of its structure.

Label **two** features of the artery on your diagram.

(3)

(c) Explain why veins need valves along their length.

(2)

.....

.....

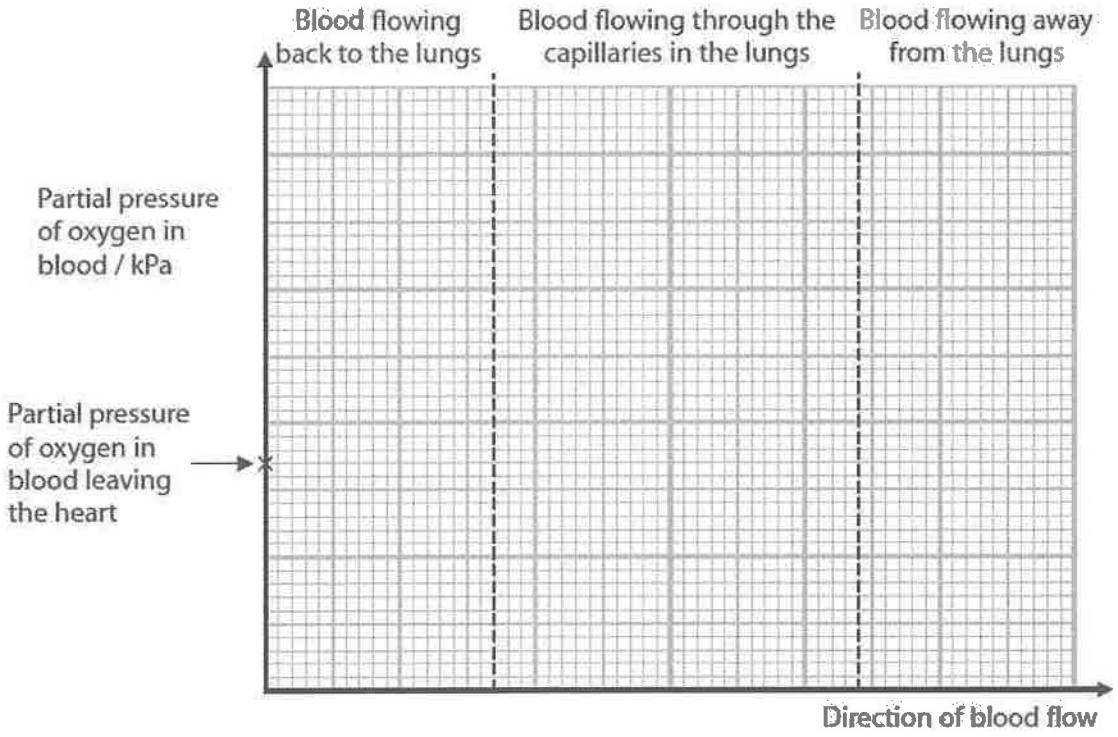
.....

.....

(d) Deoxygenated blood is taken to the lungs and oxygenated blood is taken away from the lungs.

Complete the graph to show the changes in partial pressure of oxygen in the blood as it flows back to the lungs, through the lungs and away from the lungs.

(3)

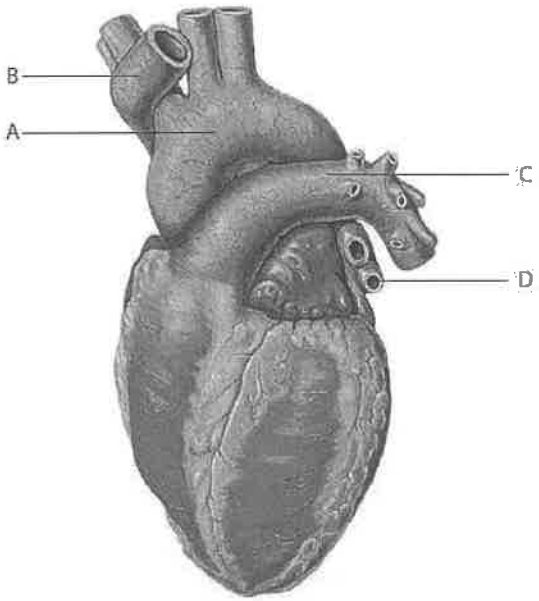


(Total for question 6 = 10 marks)

Q7.

Mammals have a heart that pumps blood through a network of blood vessels.

(a) The drawing shows a human heart.



Used under Creative Commons Attribution-ShareAlike License - Patrick J Lynch

(i) Which blood vessel takes blood from the heart to the body?

(1)

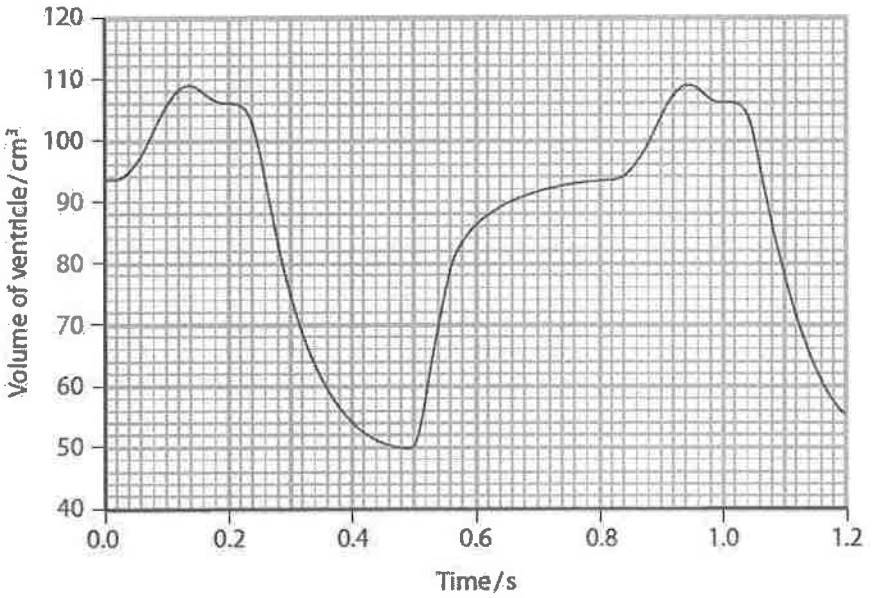
☒ **A**
☒ **B**
☒ **C**
☒ **D**

(ii) Which blood vessel has semilunar valves and contains blood with the highest concentration of carbon dioxide?

(1)

☒ **A**
☒ **B**
☒ **C**
☒ **D**

(b) The graph shows the change in volume of the left ventricle during the cardiac cycle.



(i) When is this heart in ventricular systole?

(1)

- ☒ **A** at 0.1 seconds
- ☒ **B** at 0.4 seconds
- ☒ **C** at 0.6 seconds
- ☒ **D** at 0.8 seconds

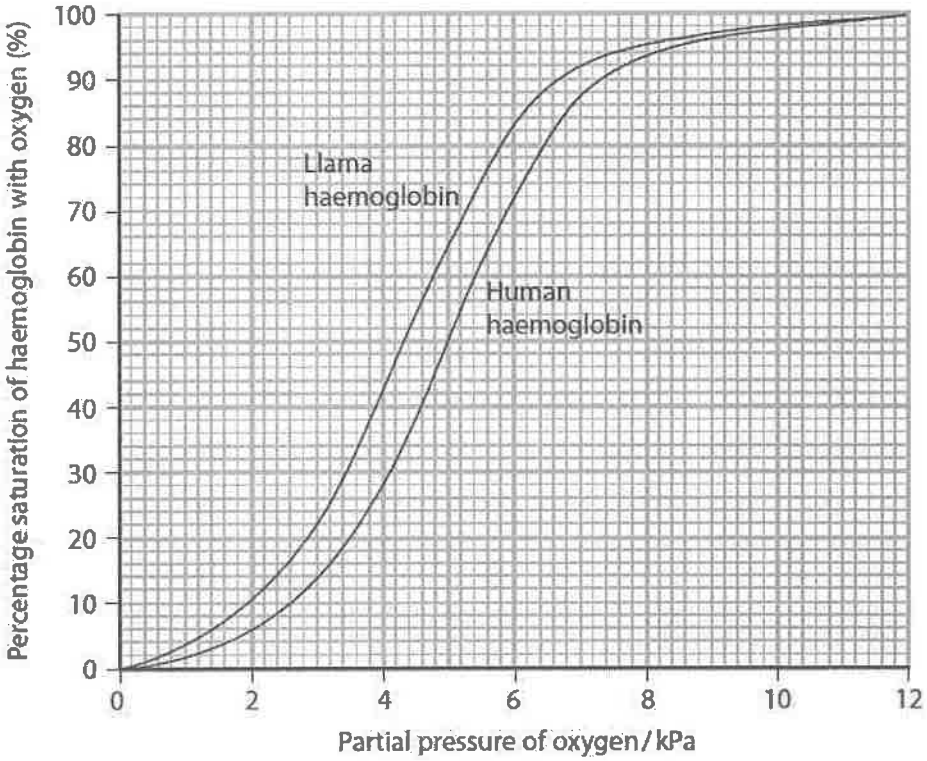
(ii) Calculate the volume of blood in dm^3 that will be pumped out of this heart by the left ventricle each minute.

(3)

Answer ..... dm^3

(c) As altitude (height above sea level) increases, the partial pressure of oxygen in the air decreases.

Llamas are mammals that are adapted to living at high altitudes.
The graph shows the oxygen dissociation curves for llama haemoglobin and human haemoglobin.



Explain the differences between the dissociation curves. Use the information in the graph to support your answer.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

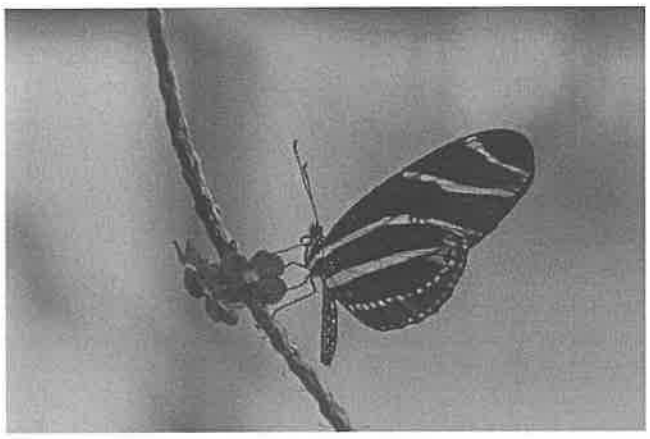
.....

(Total for question 7 = 10 marks)

Q8.

The butterfly is an insect that feeds on nectar produced by flowers.

The photograph shows a butterfly feeding on a flower.



(Source: James Schwabel / Alamy Stock Photo)

(a) The nectar in flowers contains nutrients including sugars, amino acids and lipids.

(i) The sugars in the nectar are fructose, glucose and sucrose.
Which of these contain glycosidic bonds?

(1)

- ☒ **A** fructose only
- ☒ **B** sucrose only
- ☒ **C** fructose and glucose
- ☒ **D** fructose and sucrose

(ii) Which row of the table describes how amino acids are joined together to form a protein?

(1)

	name of bond	type of reaction
☐ A	ester	condensation
☐ B	ester	hydrolysis
☐ C	peptide	condensation
☐ D	peptide	hydrolysis

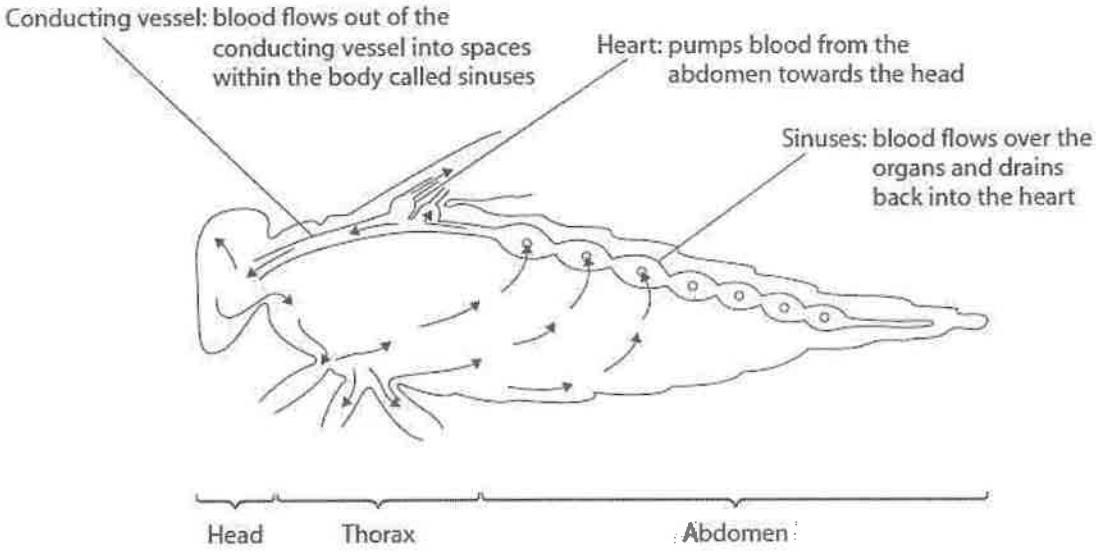
(iii) Which row of the table describes a saturated lipid?

(1)

	carbon-carbon double bonds	carbon : hydrogen ratio
☒ A	absent	higher than in an unsaturated fatty acid chain
☒ B	absent	lower than in an unsaturated fatty acid chain
☒ C	present	higher than in an unsaturated fatty acid chain
☒ D	present	lower than in an unsaturated fatty acid chain

(b) The circulatory system of an insect is described as an open system. This means that the blood is not contained inside blood vessels but flows through cavities called sinuses.

The diagram shows part of the circulatory system of an insect.



(i) The length of the head of a butterfly is 4 mm, the thorax is 6 mm and the abdomen is 18 mm.
Estimate the surface area to volume ratio of the butterfly.
Assume that the insect is a cylinder of diameter 4 mm and the surface area is 360 mm^2.

(1)

Answer .....

(ii) Explain why the circulation of a butterfly is different from the circulation of a mammal.

(2)

.....

.....

.....

.....

.....

.....

(iii) The blood flowing through the sinuses of the butterfly is separated from the organs by collagen.

Describe the structure of collagen.

(2)

.....

.....

.....

.....

.....

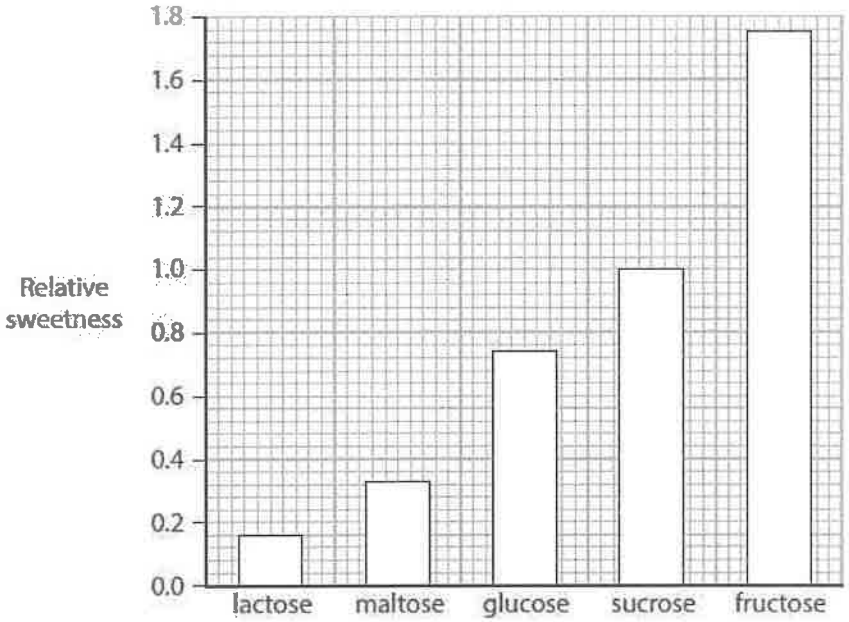
.....

(Total for question 8 = 8 marks)

Q9.

Carbohydrates are important molecules in living organisms.

(a) The graph shows the relative sweetness of some monosaccharides and some disaccharides.



(i) Which row in the table gives the correct number of monosaccharides and disaccharides shown in this graph?

(1)

	Number of monosaccharides	Number of disaccharides
☐ A	1	4
☐ B	2	3
☐ C	3	2
☐ D	4	1

(ii) Which bond joins two monosaccharides together to form a disaccharide?

(1)

☒ **A** ester
☒ **B** glycosidic
☒ **C** hydrogen
☒ **D** phosphodiester

(iii) State **two** conclusions that can be made about the relative sweetness of monosaccharides and of disaccharides.

(2)

1 .....

.....

.....

2 .....

.....

.....

(iv) Devise an investigation that a student could carry out to confirm the data shown in the graph.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(b) Amylose and amylopectin are components of starch.

Compare and contrast the structure of amylose with the structure of amylopectin.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

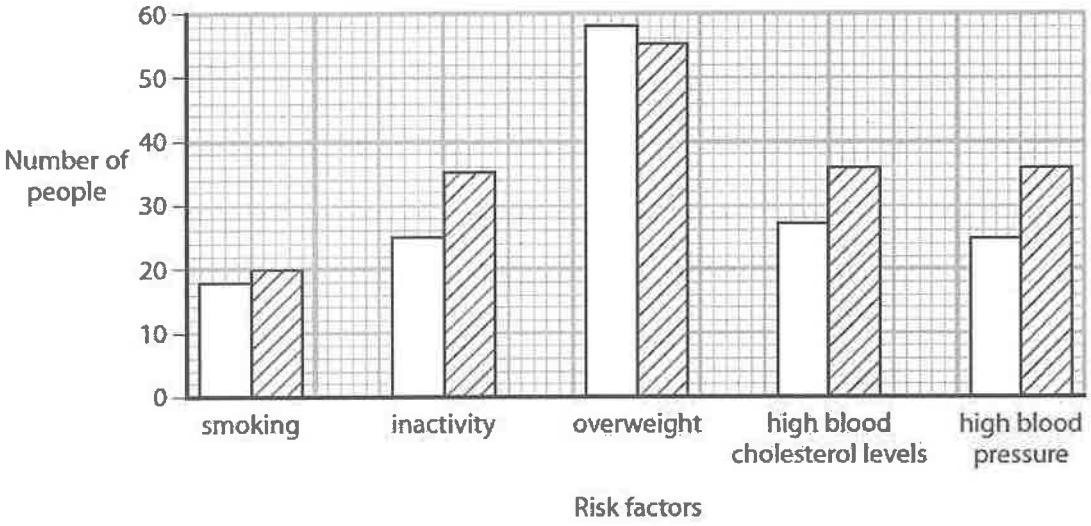
(Total for question 9 = 10 marks)

Q10.

The risk of developing cardiovascular disease (CVD) is dependent on a number of factors.

(a) People's perception of these risks are often very different from the actual risks.

A study was designed to compare perceived risks with actual risks.
A group of people were asked if they thought they were at risk (perceived risk) of CVD. The same group of people were then examined to determine their actual risks of CVD.
The graph shows the results of this study.



(i) Describe **two** conclusions that can be drawn from this study.

(2)

1 .....

.....

.....

2 .....

.....

.....

(ii) Explain how this study should have been designed to allow valid conclusions to be made.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(iii) Explain why it is important that a person's perception of a risk is close to the actual risk.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(b) The 10-year risk of a person developing CVD can be estimated in a number of ways.

The Framingham Risk Score uses a point scoring system to estimate the 10-year risk of developing CVD.
Table 1 shows the point scores for different risk factors in women.

Table 1

Risk factor	Points per age group			
	35 to 39	40 to 44	45 to 49	50 to 54
age	–3	0	+3	+6
total cholesterol level / mg dm^{-3}				
<160	0	0	0	0
160 to 199	+4	+3	+3	+2
200 to 239	+8	+6	+6	+4
240 to 279	+11	+8	+8	+5
smoker	+9	+7	+7	+4
systolic blood pressure / mm Hg				
<120	0	0	0	0
120 to 129	+1	+1	+1	+1
130 to 139	+2	+2	+2	+2

Table 2 shows the 10-year risk for the total points scored, calculated using the information in Table 1.

Table 2

Total points scored	10-year risk of developing CVD (%)
16	4
17	5
18	6
19	8
20	11
21	14
22	17

(i) Calculate the 10-year risk of CVD for a 35-year-old woman who:

- has a total cholesterol level of 242 mg dm^{-3}
- is a smoker
- has a systolic blood pressure of 132 mm Hg. (2)

Answer ..... %

(ii) Explain the lifestyle changes this woman could make to reduce her 10-year risk of CVD. Use the information in the table to support your answer.

(2)

.....

.....

.....

.....

.....

.....

(iii) Which pair of drugs may reduce the 10-year risk of CVD for this woman?

(1)

- ☒ **A** anticoagulants and statins
- ☒ **B** anticoagulants and antihypertensives
- ☒ **C** antihypertensives and platelet inhibitors
- ☒ **D** antihypertensives and statins

(iv) Suggest why this method of determining the 10-year risk of CVD may not be accurate.

(2)

.....

.....

.....

.....

.....

.....

(Total for question 10 = 15 marks)

Total for paper = 98 marks

Q1.

Question number	Answer	Mark
(a)	The only correct answer is C (two) A is incorrect because thromboplastin is an active enzyme found in the platelets but is not converted into thrombin B is incorrect because thromboplastin is an active enzyme found in the platelets but is not converted into thrombin D is incorrect because thromboplastin is an active enzyme found in the platelets but is not converted into thrombin	(1)

Question number	Answer	Additional guidance	Mark
(b)	An answer that includes the following points: • 1.8 to 3.5 (1) • below 1.8 there is a high risk of stroke (1) • above 3.5 there is an increased risk of bleeding (within the skull) (1) OR • 1.8 to 2.5 (1) • below 1.8 there is a high risk of stroke (1) • above 2.5 the risk of bleeding (within the skull) starts to increase (1) OR • 2.0 to 2.5 (1) • both risks are low / they are the lowest (combination) (1) • 3.1-3.5 has a lower risk of stroke but a higher risk of bleeding (1)	ACCEPT other ranges {have either high risk of bleeding or high risk of stroke / both risks are low} = 1 mark if mp 2 and 3 not awarded ACCEPT other ranges {have either higher risk of bleeding or high risk of stroke / both risks are low} = 1 mark if mp 2 and 3 not awarded	(3)

Question number	Answer	Additional guidance	Mark
(c)	An explanation that includes the following points: • warfarin reduces {a blood clot forming / thrombosis} (1) • {if a blood clot does not form} it cannot block the coronary artery (1) • if oxygen is supplied to the heart {muscle / cells} it will continue to {contract / respire} (1)	ACCEPT no blood clots forming less blood clotting reduces blood clot {size}	(3)

Question number	Answer	Additional guidance	Mark
(d)(i)	• 1012 / 1013 (1)		(1)

Question number	Answer	Additional guidance	Mark
(d)(ii)	An answer that includes the following points: • select a group of patients who have had a heart attack (1) • of similar {age / sex at birth / background / lifestyle} (as in the first study) (1) • give each person the same quantity of warfarin (used in the first study) (1) • {monitor for} {the same time period / four years} (1) • use of a statistics (1)	ACCEPT other appropriate factors no other health issues ACCEPT in context of one group split into two groups ACCEPT description of double-blind trial / double-blind trial / suitable named statistics test	(4)

Q2.

Question number	Answer	Additional guidance	Mark
(a)	A calculation which: • measured widths of wall as 10 mm and 30 mm (1) • shows the difference between widths, divided by smaller value (1) • × 100% (1) Example of calculation: (30 − 10) = 20 mm (20 ÷ 10) × 100 = 200%	Accept measurements consistent with printed image Correct answer with no working gains all 3 marks	(3)

Question number	Answer	Mark
(b)	An explanation that includes the following points: • formation of blood clot / thickening of artery wall (1) • therefore {blocks / narrows} coronary arteries (1) • therefore reduces blood flow (1) • therefore deprives heart muscle of {oxygen / nutrients} (1)	(4)

Question number	Answer	Additional guidance	Mark
(c)	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material indicated as relevant. Additional content included in the response must be scientific and relevant. **Indicative content** • increased cholesterol increases chance of dying from CVD • cholesterol concentrations are different in different countries • same cholesterol level does not confer same risk in different countries • greater the cholesterol to HDL ratio, the greater the risk of CVD • the smaller the diameter the LDL, the greater the risk of CVD • individuals at greatest risk of CVD are those with a large cholesterol to HDL ratio and small LDL diameter and a high cholesterol concentration • not possible to say if different risks for a particular cholesterol concentration in the first study are due to differences in cholesterol to HDL ratio / diameter of LDL	Allow differences in the first study may be due to differences in cholesterol to HDL ratio / diameter of LDL	(6)

Level	Marks	Descriptor
	0	No awardable content.
1	1-2	A scientific assessment is made of a factor, supported by the application of limited relevant evidence from the scientific information provided. No conclusion is attempted.
2	3-4	A scientific assessment is made of some of the factors, supported by the application of some relevant evidence from the analysis and with some interpretation of the scientific information. A conclusion, where needed, is made, demonstrating linkages to elements of biological knowledge and understanding, with some evidence to support the assessment being made.
3	5-6	A scientific assessment is made of the factors, supported throughout by sustained application of relevant evidence from the analysis and interpretation of the scientific information. A conclusion, where needed, is made, demonstrating sustained linkages to biological knowledge and understanding, with sufficient evidence to support the assessment being made.

Q3.

Question number	Answer	Additional guidance	Mark
(a)	The correct answer is **C**, fibrin *A is incorrect because cholesterol is not part of the wound* *B is incorrect because collagen is inside the artery wall* *D is incorrect because fibrinogen is soluble*		(1)

Question number	Answer	Additional guidance	Mark
(b)	The correct answer is **A**, 1 *B is incorrect because prothrombin is the only inactive enzyme precursor in the list* *C is incorrect because prothrombin is the only inactive enzyme precursor in the list* *D is incorrect because prothrombin is the only inactive enzyme precursor in the list*		(1)

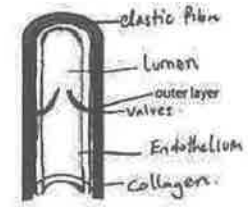
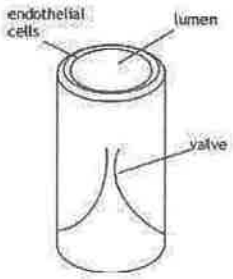
Question number	Answer	Additional guidance	Mark
(c)	The correct answer is **C**, 3 *B is incorrect because fibrin is the only insoluble molecule in the list* *C is incorrect because fibrin is the only insoluble molecule in the list* *D is incorrect because fibrin is the only insoluble molecule in the list*		(1)

Question number	Answer	Additional guidance	Mark
(d)	An explanation that includes three of the following points: • to keep thromboplastin separate from prothrombin (1) • so that prothrombin will not be converted into thrombin (1) • the blood clotting process will be prevented (1) • to have thromboplastin {available / released quickly} (when needed) (1)	ACCEPT other descriptions of what will not happen e.g. fibrin will not be formed ACCEPT will be at a high concentration (when needed) NB award mps if candidate clearly states what would happen if the thromboplastin was NOT inside platelets	(3)

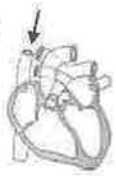
Q4.

Question number	Answer	Additional guidance	Mark
(a)	An answer that includes the following points: • number of minutes in one day calculated (1) • volume in 24 hours given in standard form (1) OR • volume in one hour calculated (1) • volume in 24 hours given in standard form (1)	$1 \times 60 \times 24 = 1440$ 7.2×10^3 (litres) $5 \times 60 = 300$ 7.2 x 103 (litres) Correct answer with no working (2) Correct answer not in standard form = 1 mark	(2)

Question number	Answer	Additional guidance	Mark
(b)	An answer that includes one similarity and one difference: Similarities: • both have walls containing {muscle cells / elastic fibres / an endothelial cell lining / an (outer) collagen layer} (1) • both have a valve (at the point they leave the heart) (1) Differences: • aorta has a {lumen with a wider diameter / thicker wall / more elastic tissue / more muscle tissue / more collagen} (1) • aorta has branches to more organs (1)		(2)

Question number	Answer	Additional guidance	Mark
(c)	An answer that includes three of the following points: • addition to diagram {additional one or two layers of wall / valves}. If valves, must be correct orientation (1) Any two from: • {endothelial cell / tunica intima} lining labelled (1) • valve labelled (1) • {(smooth) muscle / elastic fibres / tunica media} labelled (1) • lumen labelled (1)	 	(3)

Q5.

Question number	Answer	Mark
(a)	A  The only correct answer is A. *B is incorrect because the arrow is pointing down the pulmonary vein* *C is incorrect because the flow of blood is in the wrong direction* *D is incorrect because the flow of blood is out through the pulmonary artery*	(1)

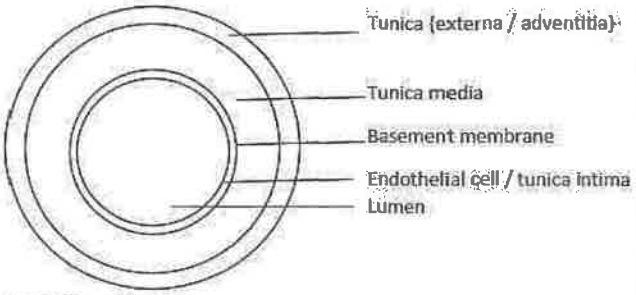
Question number	Answer	Mark
(b)	A deoxygenated blood flowing away from the heart / oxygenated blood flowing towards the heart The only correct answer is A. *B is incorrect because the pulmonary artery carries blood away from the heart and the pulmonary vein carries blood towards the heart* *C is incorrect because the pulmonary artery carries deoxygenated blood and the pulmonary vein carries oxygenated blood* *D is incorrect because the pulmonary artery carries deoxygenated blood and the pulmonary vein carries oxygenated blood*	(1)

Question number	Answer					Mark
(c)	Stage of the cardiac cycle	AV valves open and SL valves open	AV valves open and SL valves closed	AV valves closed and SL valves open	AV valves closed and SL valves closed	(3)
	atrial systole		X			
	ventricular systole			X		
	diastole		X			

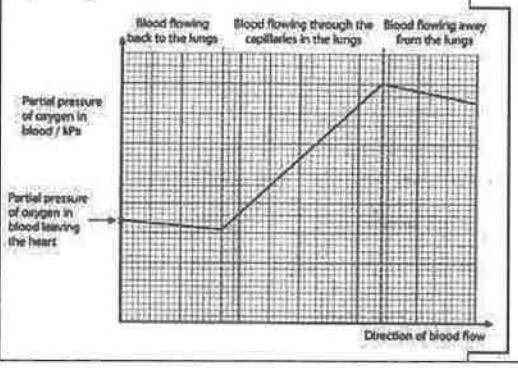
Question number	Answer	Additional guidance	Mark
(d)	A description that includes the following points: • cardiac cycle is (shorter / faster /completed more frequently) (1) • ventricles contract more forcefully (during ventricular systole) (1)	**Answers must be comparative** ACCEPT cardiac cycles happens more often ACCEPT (diastole is getting shorter / gets through diastole quicker) ACCEPT cardiac cycle occurs at a higher rate IGNORE (heart rate increases / heart pumps blood faster / heart pumps more strongly / reference to number of heart beats) IGNORE Systole (faster / shorter) ACCEPT ventricles pump blood at higher pressure	(2)

Q6.

Question number	Answer	Additional guidance	Mark
(a)	A description that makes reference to the following points: • one structure (1) • linked function (1)	e.g. single layer of cells / pores / small diameter ACCEPT thin cells / walls e.g. (single layer) gas exchange / diffusion of gases (in the lungs) (pores) plasma forced out / WBC leave / molecules can leave (small diameter) all cells close to capillaries	(2)

Question number	Answer	Additional guidance	Mark
(b)	A drawing that shows the following points: • lumen + {three layers / three other layers + endothelial layer / two layers + endothelial layer} (1) • one feature correctly labelled (1) • a second feature correctly labelled (1)	 **ACCEPT** Epithelial (layer / lining / cells) / fenestrated membrane Tunica interna Layer of (smooth) muscle and elastic fibres (and collagen) for 1 layer Award marks for longitudinal section **NB** regards mp 2 and 3 1 right + 1 wrong label = 1 mark 2 right + 1 wrong label = 1 mark 1 right + 2 wrong labels = 0 marks	(3)

Question number	Answer	Additional guidance	Mark
(c)	An explanation that makes reference to the following points: • to prevent backflow (of blood) (1) • (as blood is usually returning) (under low pressure / (often) against gravity) (1)	ACCEPT so that blood returns to the heart blood flow is in one direction	(2)

Question number	Answer	Additional guidance	Mark
(d)	A drawing that shows the following points: • pp of O_2 remaining constant as blood flows to lungs (1) • pp of O_2 rising as blood flows through the capillaries (1) • pp of O_2 remaining constant as blood flows away from lungs (1)	**ACCEPT** within 1 sm square of the verticals in each section **ACCEPT** slightly decreasing (within 1 large square) **ACCEPT** slightly decreasing (within 1 large square) 	(3)

Q7.

Question number	Answer	Mark
(a)(i)	A	(1)

Question number	Answer	Mark
(a)(ii)	C	(1)

Question number	Answer	Mark
(b)(i)	B at 0.4 seconds	(1)

Question number	Answer	Additional guidance	Mark
(b)(ii)	A calculation in which: • volume of blood per beat from graph = 59 cm^3 (1) • heart rate calculated from graph = 75 bpm (1) • volume of blood converted into dm^3 (1) Example of calculation: $(59 \times 75) \div 1000 = 4.425\ dm^3$	Accept 109 – 50 Correct answer with no working shown gains all three marks	(3)

Question number	Answer	Mark
(c)	An explanation that includes the following points: • dissociation curve for the llama is to the left of that for the human (1) • therefore llama haemoglobin has a higher affinity for oxygen (1) • llama haemoglobin will be fully saturated with oxygen at lower partial pressures (1) • this is necessary as there is less oxygen available in the atmosphere at high altitudes where llamas live (1)	(4)

Q8.

Question number	Answer	Mark
(a)(i)	**B** The only correct answer is **B**. *A is incorrect because fructose is a monosaccharide* *C is incorrect because both glucose and fructose are monosaccharides* *D is incorrect because fructose is a monosaccharide*	(1)

Question number	Answer	Mark
(a)(ii)	**C** peptide | condensation The only correct answer is **C**. *A is incorrect because ester bonds are in lipids* *B is incorrect because ester bonds are in lipids and hydrolysis splits bonds* *D is incorrect because hydrolysis splits bonds*	(1)

Question number	Answer	Mark
(a)(iii)	**B** absent | lower The only correct answer is **B**. *A is incorrect because saturated fatty acids have more hydrogens than unsaturated fatty acid of same length* *C is incorrect because there are no carbon carbon double bonds in saturated fatty acids* *D is incorrect because there are no carbon carbon double bonds in saturated fatty acids*	(1)

Question number	Answer	Additional guidance	Mark
(b)(i)	• volume of cylinder calculated (1) • ratio of surface area : volume to max 2 dps (1)	**Example of calculation:** $(3 \times 2 \times 2 \times 28$ / $\pi \times 2 \times 2 \times 28$ / $^{22}/_{7} \times 2 \times 2 \times 28$) 336 / 352 (mm^3) e.g 1.02 : 1 / 1.07 : 1 / 1 : 1 ACCEPT ratio given the wrong way round e.g. 1 : 09 NB ecf if {incorrect rounding from above / diameterused} for 1 mark	(2)

Question number	Answer	Additional guidance	Mark
(b)(ii)	An explanation that includes two of the following points: • (because the insect is small) the cells will not be far from the {sinuses / blood} (1) • (so) diffusion can supply the {oxygen / nutrients / named nutrient} (from the blood) (1) • because the insect is small it does not have {double circulation /blood vessels / closed circulatory system / complex circulatory system / high pressure} OR • because the insect has a low {metabolic rate / oxygen demand}(1) • diffusion can supply the oxygen (from blood / tracheoles) / theoxygenated and deoxygenated blood does not need to be kept separate (1) • because the insect is small it does not have {double circulation /blood vessels / closed circulatory system / complex circulatory system / high pressure}	IGNORE ref to surface area to volumeratio ACCEPT small diffusion distance between cells and {sinuses / blood} ACCEPT remove carbon dioxide diffusion supplies oxygen to cells from the tracheoles IGNORE has an open system becausethis is in the question IGNORE has an open system becausethis is in the question	(2)

Question number	Answer	Additional guidance	Mark
(b)(iii)	A description that includes two of the following points: • fibrous protein (1) • {triple / three stranded} helix (held with hydrogen bonds) (1) • (short) repeating sequences of amino acids / high {hydroxyproline / proline / glycine} content / every third amino acid is glycine(1)	IGNORE refs to secondary / tertiary /quaternary structure throughout NB piece together IGNORE alpha	(2)

Q9.

Question number	Answer	Mark
(a)(i)	B 2 | 3 The only correct answer is B *A is incorrect because glucose and fructose are monosaccharides and lactose, maltose and sucrose are disaccharides* *C is incorrect because glucose and fructose are monosaccharides and lactose, maltose and sucrose are disaccharides* *D is incorrect because glucose and fructose are monosaccharides and lactose, maltose and sucrose are disaccharides*	(1)

Question number	Answer	Mark
(a)(ii)	B glycosidic The only correct answer is B. *A is incorrect because ester bonds join organic acids and alcohols together* *C is incorrect because hydrogen bonds do not join two monosaccharides together* *D is incorrect because phosphodiester bonds join phosphate group to an organic alcohol*	(1)

Question number	Answer	Additional guidance	Mark
(a)(iii)	An answer that includes two of the following points: • monosaccharides are not more or less sweet than disaccharides (1) • a disaccharide is the least sweet and a monosaccharide is the sweetest (1) • sucrose is the sweetest disaccharide and fructose is the sweetest monosaccharide (1)	ACCEPT lactose is the least sweet disaccharide and glucose is the least sweet monosaccharide	(2)

Question number	Answer	Additional guidance	Mark
(a)(iv)	An answer that includes three of the following points: • (sugars / sugar solutions) are tasted (1) • sugars should be the same concentration (1) • mouth is rinsed out between each sugar (1) • the (relative) sweetness is compared to sucrose (1) OR If students describe Benedict's test, allow the following two marks: • add Benedict's solution and heat (1) • rank sugar by (described colour changes / time taken to reach specific colour) (1)	ACCEPT sampled IGNORE amount ACCEPT the sugars are (compared against each other / given a rating)	(3)

Question number	Answer	Additional guidance	Mark
(b)	An answer that includes the following points: similarities: • both (polymers) composed of α glucose (1) • both contain 1 - 4 glycosidic {bonds / links} (1) differences: • amylose has {1 - 4 glycosidic bonds (only) / no 1 - 6 glycosidic bonds} and amylopectin has {1 - 4 and} 1 - 6 glycosidic bonds (1)	**DO NOT** piece together unless in same sentence or two linked adjacent sentences **ALLOW** composed of glucose if α glycosidic bonds are given **ACCEPT** amylose is {a chain / helical / linear / unbranched} and amylopectin is branched **NB** 'amylose has 1 - 4 glycosidic bonds and amylopectin has 1 - 4 and 1 - 6 glycosidic bonds' scores mark points 2 and 3	(3)

Q10.

Question number	Answer	Additional guidance	Mark
(a)(i)	An answer that includes three of the following points: • (in general) people's perceptions of risks are lower than the actual risks (except being overweight) (1) • people seem to have a realistic perception of the risk of {smoking / being overweight} (1) • overweight is the most common risk factor / smoking is the least common risk factor (1)	**ACCEPT** converse that actual risks are higher (in general) (in general) people underestimate their risks **ACCEPT** perception and actual risks are very close **IGNORE** perceived risk is lower that actual risk for overweight **ACCEPT** actual risk of high blood pressure and cholesterol are the same **IGNORE** the most number of people are overweight / least number of people smoke	(2)

Question number	Answer	Additional guidance	Mark
(a)(ii)	An explanation that includes three of the following points: • large group of people (1) • sample size is large for {repeatability / reproducibility} (1) • people should not know if they have underlying health risks (before being interviewed) (1) • no known health risks for validity / otherwise it is not a perception that is being studied (1)	NB mp 2, 4 and 6 can only be awarded if mp 1, 3 and 5 have been awarded, respectively ACCEPT large sample size / more people ACCEPT to allow for a statistical analysis / description of statistical analysis e.g. SD calculated IGNORE accurate / precise / valid / reliable ACCEPT named example e.g. family history should not be on medication for CVD	(3)
	• people should have some knowledge of CVD (1) • some knowledge for validity / to reduce the number of guesses / to make an informed decision (1)		

Question number	Answer	Additional guidance	Mark
(a)(iii)	An explanation that includes three of the following points: • lifestyle can be modified (to reduce the risk / slow down progression) (1) • they could have a {blood / health} test (to assess the risk / check on the progression) (1) • medication can be {prescribed / taken} (to reduce the risk / slow down progression) (1) • if perception is greater than actual, an unnecessary change may be made (1)	ACCEPT converse i.e. what a person would not do if they underestimated the risk for mp 1, 2 and 3 ACCEPT if people know they are at risk then they can do something about it ACCEPT a described change in a named example ACCEPT named example ACCEPT named example of a change may cause stress	(3)

Question number	Answer	Additional guidance	Mark
(b)(i)	• points added up (1) • 8 (%) (1)	(-3 + 11 + 9 + 2) 19 Bald answer = 2 marks (11+9+ 2=22) 17(%) = 1 mark	(2)

Question number	Answer	Additional guidance	Mark
(b)(ii)	An explanation that includes two of the following points: • stop smoking as this would reduce {damage to the endothelial lining / lower blood pressure} (1) • reduce {cholesterol / saturated fats} in the diet so less to build up the {plaque / atheroma} (in the arteries) (1) • reduce {salt intake / stressful activities} as this would lower blood pressure (1)	ACCEPT the converse throughout for what would happen if the changes were not made ACCEPT increase antioxidants to reduce free radicals generated by smoking ACCEPT atherosclerosis increase in fibre to reduce absorption of cholesterol ACCEPT increase exercise / consume less caffeine	(2)

Question number	Answer	Mark
(b)(iii)	The only correct answer is D, antihypertensives and statins *A is incorrect because anticoagulants do not reduce blood pressure or blood cholesterol levels* *B is incorrect because anticoagulants do not reduce blood pressure or blood cholesterol levels* *C is incorrect because platelet inhibitors do not reduce blood pressure or blood cholesterol levels*	(1)

Question number	Answer	Additional guidance	Mark
(b)(iv)	An answer that includes two of the following points: • other factors are risk factors that have not been included (1) • the {cholesterol levels / blood pressure} may have to be estimated (1) • does not include {the number of cigarettes smoked / ex smoker} (1)	**ACCEPT** named factor e.g. body mass, activity levels, diabetic, genetic predisposition, passive smoking **IGNORE** sex / gender **ACCEPT** does not include {HDL / LDL:HDL} / diastolic B P **IGNORE** not accurate **IGNORE** under estimates / lying / passive smoking	(2)