

Cholesterol

1. Which of the following statements about Low Density Lipoprotein (LDL) and High Density Lipoprotein (HDL) is correct?

A LDL deposits cholesterol in the arteries.
B LDL transports cholesterol to the liver.
C HDL transports cholesterol to body cells.
D HDL releases cholesterol in the body cells.

2. Which of the following statements describes correctly the role of lipoprotein in the transport and elimination of excess cholesterol?

A Low density lipoprotein transports excess cholesterol from the liver to the body cells.
B Low density lipoprotein transports excess cholesterol from the body cells to the liver.
C High density lipoprotein transports excess cholesterol from the liver to the body cells.
D High density lipoprotein transports excess cholesterol from the body cells to the liver.

3. The ratio of high-density lipoproteins to low-density lipoproteins in the blood (HDL:LDL) is related to the level of cholesterol in the blood. This in turn can influence the chances of developing atherosclerosis.

Which line in the table below correctly illustrates these relationships?

	<i>HDL:LDL</i>	<i>Cholesterol level</i>	<i>Chance of atherosclerosis</i>
A	High	Low	Reduced
B	High	High	Increased
C	Low	Low	Increased
D	Low	High	Reduced

4. Statins are drugs which are used to control blood

A pressure
B insulin level
C glucose level
D cholesterol level.

Cholesterol

5. Which statement about lipoproteins is correct?

- A Low density lipoproteins (LDLs) transport cholesterol from body cells to the heart.
- B Low density lipoproteins (LDLs) transport cholesterol from body cells to the liver.
- C High density lipoproteins (HDLs) transport cholesterol from body cells to the heart.
- D High density lipoproteins (HDLs) transport cholesterol from body cells to the liver.

1a). Researchers concluded that taking the cholesterol reducing drug decreased risk of death from CVD, as it lowered the concentration of LDLs in the blood.

Explain why having a lower LDL concentration in the blood decreases the risk of death from CVD.

2

b) (i) Name a type of medication used to reduce blood cholesterol concentrations.

1

(ii) Explain the benefit of regular physical activity to individuals suffering from high blood cholesterol.

2

2). Suggest why statins are prescribed to individuals to reduce the risk of a heart attack.

2

3).

	Number of males with raised cholesterol levels (per 1000)									
Age group (years)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Under 15	1	1	0	1	0	0	0	2	0	1
15–44	33	33	31	29	21	21	22	16	18	14
45–64	236	232	217	209	132	139	134	137	125	128
Over 64	274	316	295	274	167	166	164	167	171	167

a). (i) Name a type of drug that is used to control cholesterol levels.

1

(ii) Use the data in the table to identify the year in which this type of drug became widely available.

1

b) State **one** role of cholesterol in the body.

1

Cholesterol

4a). Describe **one** function of cholesterol in the human body.

4).

(b) FH results in non-functional LDL receptors.

Explain why non-functional LDL receptors can lead to an individual having high blood pressure.

2 a).

b).

c). The man's blood HDL to LDL ratio was lower than normal.
Describe how this may have contributed to atherosclerosis.

1

Cholesterol

1. A
2. D
3. A
- 4 D
5. D
- 6.

1a less cholesterol deposited in arteries (1 mark)

Less chance of an atheroma forming (1 mark)

1b (i) statin

(ii) increase HDL : LDL ratio (1 mark)

Less cholesterol in arteries/blood (1 mark)

2. reduce production of cholesterol (1 mark)

Reduce cholesterol in arteries to form atheromas (1 mark)

3a (i) statin (ii) 2007/2008

b) part of the cell membrane OR used to make steroid hormones/oestrogen/testosterone/progesterone

4a) Part of the cell membranes OR used to make steroid hormones (oestrogen/testosterone/progesterone)

b) cholesterol deposited in the arteries by LDL (1 mark)

Atheroma forms (1 mark)

CVD & PVD

1. Atheromas can rupture, damaging the endothelium and triggering the following events.

1. A thrombus forms
2. Clotting factors are released
3. Fibrinogen is converted into fibrin
4. Prothrombin is converted into thrombin

Which of the following sequences shows the order in which these events occur?

- A 1, 3, 4, 2
- B 2, 4, 3, 1
- C 2, 3, 4, 1
- D 1, 2, 4, 3

2. Chronic elevation of blood glucose levels is **not** responsible for which of the following conditions?

- A Renal failure
- B Retinal damage
- C Phenylketonuria
- D Peripheral nerve dysfunction.

3. The events leading to formation of a blood clot are listed below.

1. Clotting factors are released.
2. An insoluble meshwork forms.
3. Fibrinogen is converted to fibrin.
4. Prothrombin is converted to thrombin.

The correct sequence of these events is

- A 4, 2, 3, 1
- B 1, 4, 3, 2
- C 1, 3, 4, 2
- D 4, 3, 1, 2

4. During clot formation, thrombin

- A forms prothrombin
- B causes formation of fibrin threads
- C causes the release of clotting factors
- D forms a meshwork that clots the blood.

5. During the formation of a thrombus, fibrin

- A converts prothrombin to thrombin
- B causes the formation of fibrinogen
- C forms a meshwork to clot the blood
- D causes the release of clotting factors.

CVD & PVD

6. Peripheral vascular disease most commonly occurs in the arteries to the

- A leg
- B lung
- C brain
- D heart.

1a) Describe what causes a stroke.

1

b). Paralysis occurs when voluntary muscle is unable to contract.

Explain how a stroke could lead to muscle paralysis on the left side of the body.

2

c). Describe how untreated diabetes may damage the retina.

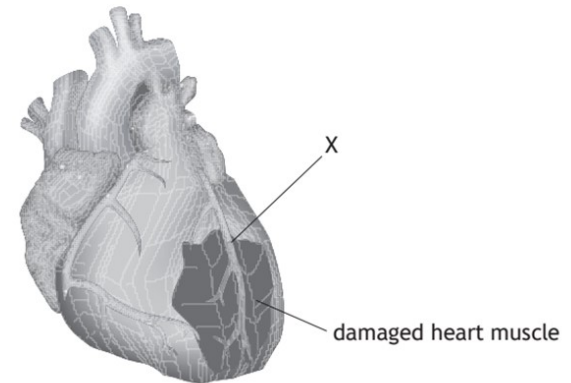
1

d) The man's blood pressure was measured as 160/100.

(i) Explain how atherosclerosis could have caused this high blood pressure.

2

2. The diagram shows muscle damage in the heart of an individual who has had a heart attack.



(a) (i) Name blood vessel X.

1

(ii) Explain how the formation of a thrombus in blood vessel X results in heart muscle damage.

1

CVD & PVD

3. Describe how an atheroma forming under layer X may lead to the formation of a blood clot and state the possible effects of this.

5

CVD & PVD Answers

1. B
2. C
3. B
4. B
5. C
6. A

1a) blood clot/thrombus in brain arteries

b) lack of oxygen kills brain cells in the right hemisphere (1 mark)

Impulses not transmitted to muscles in left side of body (1 mark)

c) endothelium damaged OR haemorrhage of blood vessels

d) atheroma forms (1 mark) narrows diameter of artery lumen/loss of elasticity in arteries

2a (i) coronary artery

(ii) heart muscle deprived of oxygen

3.

	<u>Formation</u> 1. The atheroma can rupture damaging the endothelium / layer X. 2. Clotting factors are released. 3. Prothrombin is converted / changed / activated into thrombin. 4. Fibrinogen is converted into fibrin (by thrombin). 5. Fibrin / threads form a meshwork that seals the wound / clots the blood. <u>Effects</u> 6. The clot / thrombus formed may break loose, forming an embolus. 7. A clot / thrombus may lead to a heart attack / stroke.	5	Candidates must give at least one point from each area to gain 5 marks.
--	---	----------	---

3.

CVD & PVD

A blockage/clot/embolism in an artery/blood vessel leading to/in the brain.

Lack of oxygen kills (brain) cells/ tissues. Stroke/damage/lack of oxygen occurs in the right side/hemisphere of the brain/motorcortex/cerebrum. Impulses/signals are not transmitted/ sent to the the left side of the body). OR Impulses/signals are not transmitted/ sent so preventing movement (on the left side of the body).