

1. Quality of written communication should be considered in crediting points in the marking scheme. In order to gain credit, answers must be expressed logically in clear, scientific terms.
- (a) (i) Region around coronary arteries below clot is shaded;
(*shading does not take in areas served by other blood vessels*) 1
- (ii) Region is deprived of (blood and therefore) oxygen;
Cannot respire aerobically / must respire anaerobically;
Lactate is formed;
Muscle cannot contract / eq. ;
Cell death / tissue death; (max 3)
- (b) Plasma cholesterol:
More laid down in lining of arteries;
Walls of arteries damaged / weakened;
Arteries are narrowed;
Aneurysm forms;
Clot forms; (max 2)
- High blood pressure:
Increases rate at which cholesterol is laid down;
Higher fibrinogen levels;
Clots form (once only); (max 2)
- Smoking:
Increases blood pressure:
Muscle in artery becomes thicker / lumen narrower; (max 2)
- (c) (i) Risk increases 3 times;
Evidence of correct working (e.g. 7.5/2.5); 2
- (ii) Increasing cholesterol levels carries greater risk;
Starting smoking increases risk from 2.5% to 3% ;
Increasing cholesterol levels from 5 to 7 increases risk from 2.5% to 5% ; 3
2. (a) (i) (Risk of):
High blood pressure increases with age;
Heart attack increases with age / no heart attacks before 35 years; 2
- (ii) *Females* (or reverse argument for males):
More likely to develop high blood pressure;
Have lower risk of heart attack (as they get older / post-55); 2
- (b) Male is $(700 - 378 = 322, 322 / 700 =)$ 46%;
Female because $(480 - 252 = 228 / 480 =)$ 47.5%; 2

[15]

(c) *Principle:*

CHD = heart muscle receives inadequate amount of blood
or oxygen / (coronary) blood supply reduced;

Smoking:

Raises concentration of fibrinogen (in blood) / increased risk of
clotting;

Increases viscosity of blood;

(Nicotine) causes platelets to stick together / causes vasoconstriction;

Carbon monoxide associated with plaque formation;

Reduces ability of arteries to dilate / reduces elasticity;

Cholesterol:

Fatty streaks / deposits adhere to wall of arteries;

Atheroma / atherosclerosis / plaque;

Narrows lumen of artery;

Damages endothelium;

Can lead to formation of thrombus / blood clot;

6 max

Clots need to be in context

[12]

3. (a) $\frac{\text{measured diameter (mm)}}{1.94} = \text{magnification};$ 1

[Note: marks in this answer are awarded for explanation.
The answer gains no marks]

- (b) (i) Lumen narrower (in diseased artery);
Wall thicker (in diseased artery);
Cholesterol/fatty tissue/plaque/lipids/atheroma/foam cells invading
wall/in wall(i.e. not on endothelium); max 2
[Note: If answers start "it" assume this refers to the diseased artery]

- (ii) Atheroma/fatty material deposited in wall of artery;
Causes turbulence/damage to endothelium/raises blood pressure;
Blood clot formation;
Atheroma/blood clot lodges in narrowed blood vessel/coronary artery;
Reduces oxygen (supply) to (region of) heart muscle/heart cells; max 3

[6]

4. (a) (i) because there are big differences;
any correct named example e.g. lung cancer/bronchitis much lower
in women than in men; 2
- (ii) easier to compare if sample size effectively the same;
different numbers of people in each group; 2

- (b) ANY TWO: more stress / more saturated fats in diet / less time to exercise / reliance on cars; 2

[6]

5. (a) 1 fatty substance / foam cells / cholesterol in artery wall / under endothelium;
 2 atheroma creates turbulence / damage to lining of artery;
 3 formation of plaques / atherosclerosis / narrows lumen of artery;
 4 (turbulence) increases risk of blood clot / embolus;
 5 blood clot / thrombus breaks off;
 6 (blood clot) lodges in coronary artery;
 7 reduced blood supply to heart muscle;
 8 reduced oxygen supply;
 9 leads to death of heart muscle; max 6

- (b) (i) average number of admissions on ordinary day;
 when no football match being played;
 similar time of year / conditions; max 2

- (ii) large / significant difference for three days;
 then small difference; 2

- (c) increases heart rate;
 raises blood pressure / causes hypertension;
 blood supply to heart / oxygen use by heart increased;
 atheroma restricts blood / oxygen supply to heart muscle; max 2

- (d) reduces heart rate;
 beta-blocker fits receptor sites;
 on walls of heart / blood vessel;
 (receptor sites for) adrenaline / noradrenaline / stops adrenaline / noradrenaline binding; max 3

[15]