

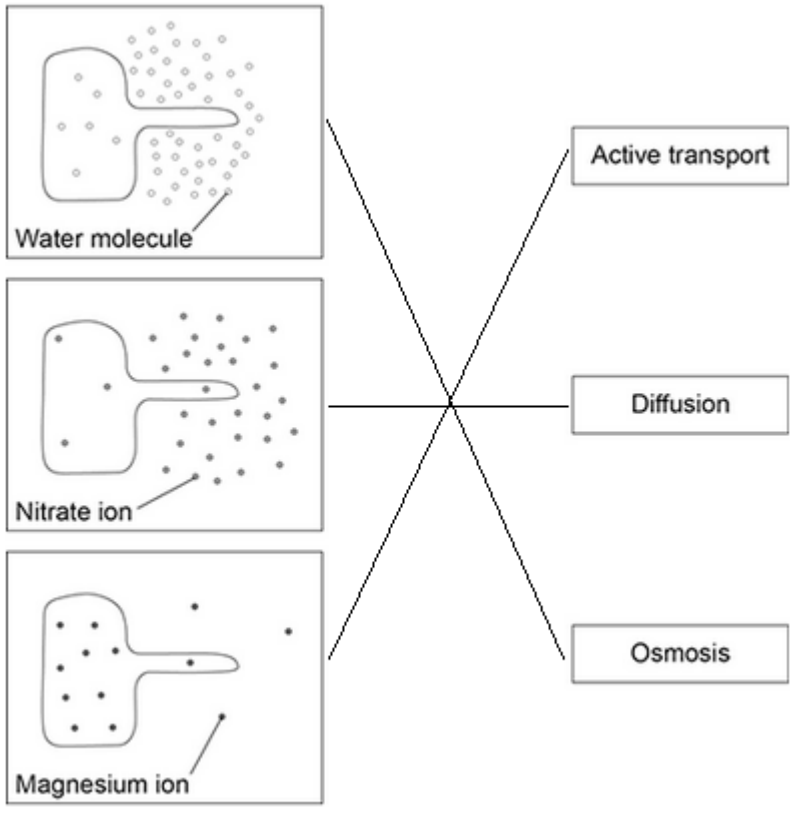
# Mark schemes

**1**

- (a) cell membrane  
*extra boxes ticked negates mark*
- (b) nucleus  
*extra boxes ticked negates mark*
- (c) has a tail so it can swim (to an egg)  
*accept has many mitochondria to release energy to swim*

1  
1  
1

(d)



*all three correct for 2 marks  
one or two correct for 1 mark*

2  
**[5]**

**2**

- (a) 8 (micrometres)
- (b) red blood cell(s)  
  
white blood cell(s)  
*accept named cell  
eg phagocyte / lymphocyte*

1  
1  
1

(plasma)  
transports proteins / dissolved substances / food (molecules) / urea / hormones / blood cells

1

(c) any **one** from:

- you could lose a lot of blood
- bleed internally  
*allow bleeding would not stop*  
*allow could bleed to death*

1

[5]

3

(a) mitosis

*extra box ticked negates mark*

1

(b) cell division is uncontrolled

*extra box ticked negates mark*

1

(c) any **one** from:

- smoking / tar
- alcohol
- carcinogens  
*allow named chemical*
- viruses (living in cells)
- (ionising) radiation  
*accept UV / X-rays / gamma waves*

1

(d) bar plotted at 78%

*ignore width of bar*

1

(e) testicular

*extra box ticked negates mark*

1

(f) prostate

*extra box ticked negates mark*

1

- (g) any **two** from:
- improved treatment / drugs
  - earlier diagnosis
  - more cancer screening
  - improved patient knowledge (of risk factors)
- allow improved patient diet / lifestyle*

2

[8]

**4** (a) any **two** from:

- same result at pH 7 and 7.5  
**or**  
could be any pH between 7 and 7.5  
**or**  
not tested at pH 7.25  
**or**  
need to test at smaller pH intervals (between 7 and 7.5)
- accuracy of result only to nearest 0.5 minutes
- no repeats
- difficult to determine end point (colour)

2

(b) 2.7 / 5

1

0.54 (units per minute)

*allow 0.52 with no working shown for 2 marks*

1

*allow 1 mark for 0.52 **or** 0.56*

(c) (after 10 minutes) solution goes black

1

(after 60 minutes) solution stays the same

**or**

does not go black

**or**

goes slightly orange

1

(d) steeper curve

1

levels off at 11.8 units **and** before 45 minutes

1

[8]

**5** (a) cells can break off

*allow cells invade other tissues*

1

travel in blood

*accept travel in lymph (fluid)*

1

(b)  $\frac{(89 - 48)}{48} \times 100 = 85.41\bar{6}$

1

85.4 (%)

*allow 85.4 (%) with no working shown for 2 marks)*

1

(c) any **two** from:

- similar survival rates for diagnosis in 1961
- survival rate (for diagnosis in 2011) is 1.5 times greater for prostate cancer compared to bowel cancer
- (survival rates) have improved for both cancers
- (survival rate) for prostate cancer has improved more

*accept survival rate for bowel cancer has increased 2.4 times **but** for prostate cancer 3.4 / 3.36 times*

2

plus **two** from:

- earlier diagnosis
- improved screening programmes
- improved drugs
- difference in level of aggression of cancers
- difference in ease of removing tumours

*reason must be correctly linked to comparison*

2

[8]

6

(a) plasma transports proteins / dissolved substances / food (molecules) / urea / hormones

**or**

blood cells are suspended in the plasma

1

platelets are involved in blood clotting

1

(b) the right side of the heart pumps blood to the lungs

**and**

the left side of the heart pumps blood around (the rest of) the body

1

(c) **Level 3 (5–6 marks):**

A detailed and coherent evaluation is provided which considers a range of relevant points and comes to a conclusion consistent with the reasoning.

**Level 2 (3–4 marks):**

An attempt to relate relevant points and come to a conclusion. The logic may be inconsistent at times but builds towards a coherent argument.

**Level 1 (1–2 marks):**

Discrete relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

**0 marks:**

No relevant content

**Indicative content**

**pros of statins:**

- decreases blood cholesterol
- slows down build-up of fatty material in arteries
- (so) blood can flow to heart muscle cells

**cons of statins:**

- drug has to be taken regularly **or** may forget to take drug
- drug will need to be taken long-term
- side-effects of taking the drug
- effects of drug will take time to happen

**pros of stents:**

- blocked artery is held open
- (so) blood can flow to heart muscle cells
- will remain in place / work for a long time
- rapid recovery time

**cons of stents:**

- risk of infection from procedure
- risk of surgery eg heart attack
- risk of thrombosis **or** blood clot

a justified conclusion

6

[9]

7

(a) (A) right atrium

1

(B) right ventricle

1

(b) To take blood from the lungs to the heart

1

(c) keeps the (coronary) artery open / wide

1

so the blood can carry glucose and oxygen

1

to the heart (muscle)

1

for respiration

1

*if marking points 2, 3 and 4 not awarded allow 1 mark for 'keep a (constant) flow of blood to the heart (muscle)'*

(d) bar **D** correctly plotted

1

bar **E** correctly plotted

1

*± 0.5 small squares*

(e) twice / two times (more likely)

1

(f) **Level 3 (5–6 marks):**

A detailed and coherent evaluation is provided that considers a range of relevant points about how well the data correlates with the statement, quoting relevant comparisons and comes to a conclusion consistent with the reasoning.

**Level 2 (3–4 marks):**

An attempt to relate relevant points within the data and come to a conclusion. The logic may be inconsistent at times but builds towards a coherent argument.

**Level 1 (1–2 marks):**

Discrete, relevant points made, attempting to apply understanding of the factors involved in development of CHD to the data in the table. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

**0 marks:**

No relevant content

**Indicative content**

data that supports statement:

- country A has the highest death rate at 285 deaths per 1000 and the lowest consumption at only 180 kg per person
- death rate in country E is less than half that in country A (125 compared with 285) and consumption is higher (244 compared with 180)
- other countries with lower death rates than A have higher consumption (eg country B 250 deaths per 1000 but consumption of 320 kg per person)

arguments against statement:

- but most of the data on the graph does not show clear correlation between death rates and consumption of data
- eg death rate in country B is second highest at 250 deaths per 1000 but consumption is highest at 320 kg per person, nearly double that in A where death rate is only 35 per 1000 more
- differences show no clear pattern – eg in countries where death rate is much lower the consumption is not a similar proportion higher (cf country D death rate just under half that in A but consumption not double that in A)
- there may be other factors affecting death rate that are not reported, such as smoking, obesity, exercise, stress

6  
[16]

8

(a) any **two** from:

- to work out the correct dose to be given
- to check that the drug is working correctly
- to check for toxic effects.

2

(b) patients are randomly allocated to receive statin or a placebo

1

so neither patient nor doctor knows who has received which

1

answer in terms of only the drug company knows who is taking the  
statin or the placebo gains 2 marks

(c) To prevent false claims 1

(d) drug **A** reduced the blood cholesterol level more than drug **B** 1

drug **A** reduced the thickness of the artery **or** drug **B** increased the thickness of the artery  
*allow drug A made the artery thinner or drug B made the artery thicker*

1

*ignore side effects*

(e) differences in number of patients reporting side effects are very similar 1

we don't know what the patients died of

1

[9]

9

(a) (lack of) exercise

*allow description of type or amount of exercise*

1

*allow other risk factors not mentioned in table, eg high cholesterol levels, blood pressure, levels of obesity, diabetes*

(b) the second highest death rate has the highest fruit and vegetable consumption

the lowest death rates don't have high fruit and vegetable consumption

lowest death rates have a low percentage of the population that smokes.

3

(c) (it builds up) inside the coronary arteries

1

(causing) them to narrow

1

(this) reduces blood flow

1

so less oxygen gets to the heart muscle

1

(d) (statins) reduce cholesterol in the blood

1

so there is less build up of fatty material (in coronary arteries)

*allow slows the rate of fat deposit*

1

[10]



10

(a) xylem

1

(b) **A** is phloem, **B** is xylem

1

any **three** from:

- phloem transports sugars
- there are more sugars in fluid A
- xylem transports mineral ions / potassium ions / nitrate ions
- there are more mineral ions in fluid B.

3

(c) correct conversion of 1.18  $\mu\text{g}$  to  $\text{mg} / \text{cm}^3$

1

$$\frac{118}{0.00118} = 100\,000$$

*allow 1 mark for 100 (ie no conversion to mg)*

*allow 100 000 with no working shown for 2 marks*

1

(d) potassium ions are transported into the root

1

against a concentration gradient

1

by active transport

1

**[10]**