

## Mark schemes

**Q1.**

- (a) (physical) barrier  
**or**  
stops pathogens entering (blood / body)

*allow named pathogen throughout*  
*allow produces antimicrobial secretions*  
*allow produces oil / sebum / sweat*  
*ignore reference to scabs / clots*

1

- (b)

$$\begin{array}{r} 63 \\ \hline 210 \end{array}$$

1

$$\frac{3}{10}$$

*allow 0.3*  
*ignore 30%*

*if neither mark awarded allow  $\frac{210}{63} = \frac{10}{3}$  for 1 mark*

1

- (c) (at pH1) 187 (killed)

*ignore negative symbol throughout*

1

(at pH5) 31 (killed)

1

$(187 - 31) = 156$   
(more bacteria killed)

*allow correct subtraction using incorrect calculation*  
*at pH1 and/or pH5*

1

(d) (the student) calculated the midpoint

1

(between) 23 and 63

**OR**

any **two** from:

- $\frac{63 - 23}{2} = 20$

- $20 + 23 = 43$

- $63 - 20 = 43$

*allow (between values at) pH1 and pH3*

*allow  $\frac{23 + 63}{2} = 43$  for 2 marks*

*allow plot data from the table on graph (1) then  
read off value for pH2 (1)*

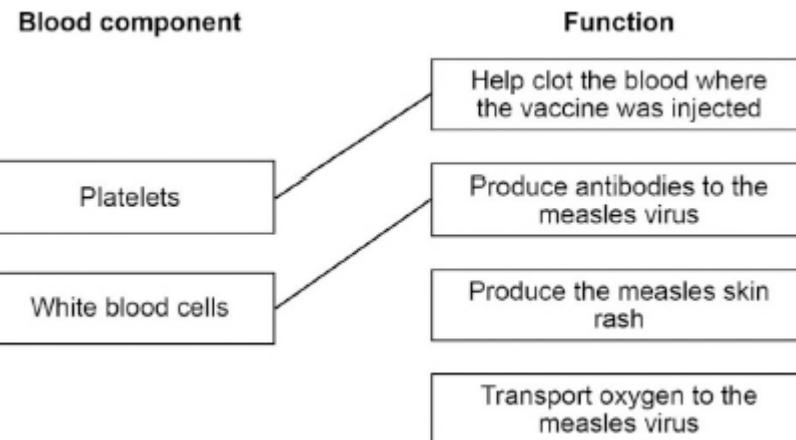
*allow other correct methods for up to 2 marks*

1

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**Q2.**

(a)



1

do **not** accept more than one line from a box on the left

1

(b) 1968

*allow 1969*

1

(c) increases

1

(then) levels off / plateaus

*allow (then) stays the same**allow reaches a maximum**between 1956 and 1968*

1

(then) decreases

*ignore use of numbers of people**if no other mark awarded allow 1 mark for (overall)  
decrease*

1

(d) (the percentage) decreased

*allow (the percentage)**decreased then increased**allow (the percentage) changed from 92% to 80%*

1

(e) parents were worried their children would get condition X

1

(f) have the research peer reviewed

1

(g) any **one** from:

- (the author was) biased
- (the author was) influenced by money
- because the research was not peer reviewed
- there was not enough evidence
- small sample size

*ignore (the author) was paid*

1

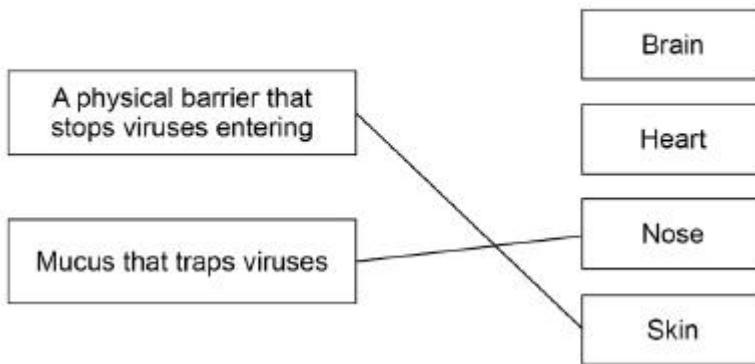
[10]

**Q3.**

(a) pathogens

1

(b)

**Defence****Part of the body that provides the defence**do **not** accept more than one line from a box on the left

2

(c) division

1

(d) malignant tumours have cells that can spread to other parts of the body

1

malignant tumours may form secondary tumours

1

(e) (percentage) decreases

1

(f) more females were vaccinated (over time)

*allow males may also be vaccinated**allow more people were vaccinated**allow increased use of (named) barrier methods of contraception**allow more awareness / education (about HPV)*

1

(g) white blood cells

1

(h) antibodies

1

(i) any **one** from:

- people are afraid of side / unknown effects  
*allow there are side effects*  
*allow people think they cause (named) disease*
- religious / cultural objections  
*ignore religion unqualified ignore moral / ethical objections*
- (some people) believe they don't work
- some people think (HPV) vaccine encourages sexual activity  
*ignore pain of injection*

1

[11]

**Q4.**

(a) vector

1

(b) any **two** from:

- (it has) mitochondria
- (it has a) nucleus  
*if neither mark awarded, allow 1 mark  
for protist has membrane-bound  
structures  
allow it does not have a loop of DNA*
- (it has) no plasmids  
*allow other appropriate features  
do not accept (it has) cytoplasm  
do not accept (it has) a (cell)  
membrane  
do not accept it has no cell wall*

2

(c) Salmonella

1

(d) only one parent is involved

1

(e) 14

1

(f) decreased haemoglobin

1

$$\frac{210\ 000\ 000}{2}$$

or

105 000 000

*allow alternative route  
allow correct conversion to standard  
form at any stage*

$$\frac{210\ \text{million}}{2}$$

or

105 million

1

$105\ 000\ 000 \times 3$

*allow 105 million  $\times 3$*

1

315 000 000

*allow 315 million*

1

$3.15 \times 10^8$

1

(h) any **two** from:

- wear long(er) sleeves / clothes  
*allow reduce bare skin exposure*
- use insect repellent or insecticides  
*allow insect repellent methods such as citronella candles*
- don't go out in the evening  
*allow close doors / windows in the evening*
- avoid going to countries / places with malaria / mosquitos
- destroy breeding grounds  
*allow methods of destroying breeding grounds such as drain water holes*
- release sterile male mosquitos

2

*ignore vaccination / anti-malarial drugs*

*allow other correct suggestions*

(i) percentage / chance (of getting malaria) decreases (with age)

*do not accept percentage / chance of having disorder S*

*decreases with age*

1

correct use of data such as two pairs of data from the table

*allow use of processed data*

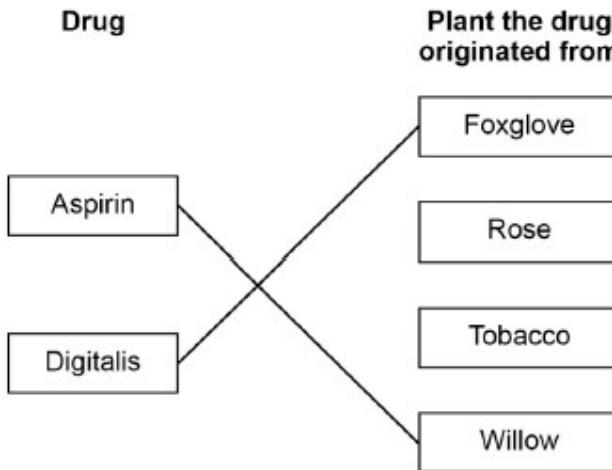
1

[15]

**Q5.**

- (a) sexual intercourse 1
- (b) increased (at first) 1
- (then) decreased  
*ignore numbers unqualified*  
*do not accept an implication of an overall increase*  
*if no other mark awarded allow (overall) decrease for 1 mark* 1
- (c) better education on how to prevent the spread of HIV 1
- (d) (C) → E → A → B → D  
*allow 1 mark for E → A link*  
*allow 1 mark for A → B link*  
*allow 1 mark for B → D link*  
*if no other mark awarded allow 1 mark for an answer of*  
(C) → E → B → A → D 3
- (e) testing on healthy volunteers 1
- (f) drugs that destroy viruses also damage body tissues 1

(g)



*do not accept more than one line from a box on the left*

2

[11]