

Mark schemes

1

(a) 8 (micrometres)

1

(b) red blood cell(s)

1

white blood cell(s)

accept named cell

eg phagocyte / lymphocyte

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

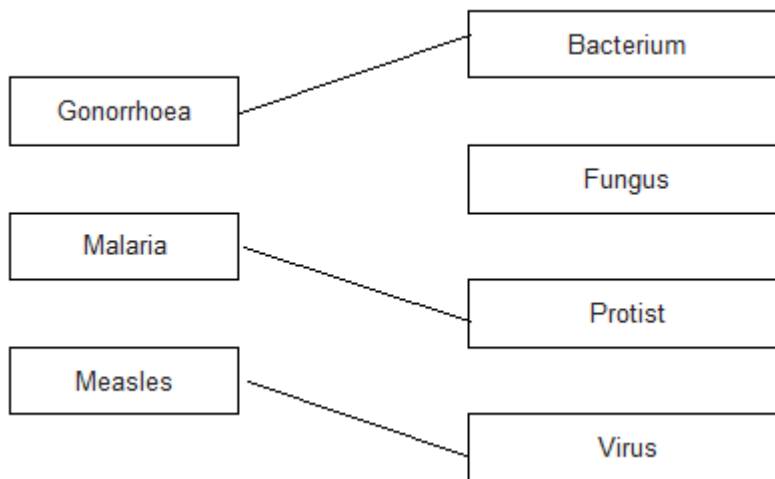
allow could bleed to death

1

[5]

2

(a)



3

(b) (trachea) has mucus

1

to trap pathogens

1

(trachea) has cilia

1

to move mucus out of trachea

1

(c) **dependent variable:**
number of times mosquitoes landed on socks

1

control variable:

any **one** from:

- number of mosquitoes in each container
- length of time socks worn
- dampness of socks
- same type of socks
- size of container
- time
- temperature
- species of mosquito
- age of mosquito

1

(d) use worn socks
or
use chemical from worn socks

1

to attract / trap infected mosquitoes

1

or accept:

wear clean socks / change socks regularly (1)

to reduce the chance of attracting mosquitoes (1)

(e) less chlorophyll present

1

(so) less light absorbed

1

(so) reduced photosynthesis

or

(so) less sugar / food made

1

[14]

3

(a) any **one** from:

- not all deaths recorded
- not all causes of deaths recorded

allow cause may not be known

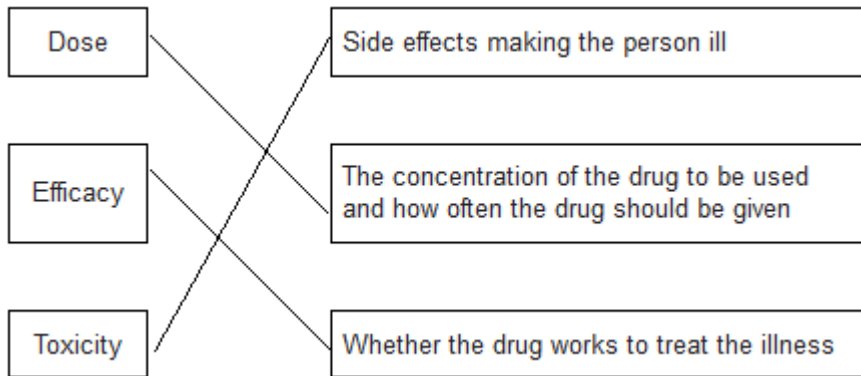
1

(b) antibiotics do not kill viruses

allow antibiotics only kill bacteria

1

(c)



all correct for 2 marks

1 or 2 correct for 1 mark

2

(d) any **one** from:

- to prevent false claims
- to make sure the conclusions are correct / valid
- to avoid bias

1

[5]

4

(a) any **one** from:

- not all deaths recorded
- not all causes of deaths recorded

allow cause may not be known

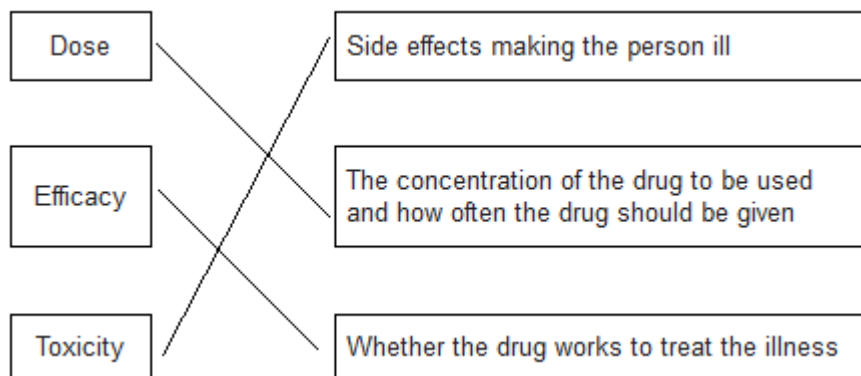
1

(b) antibiotics do not kill viruses

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all correct for 2 marks

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2

(d) any **one** from:

- to prevent false claims
- to make sure the conclusions are correct / valid
- to avoid bias

1

(e) some people would be immune to EVD

allow those vaccinated would not contract the disease

1

if less people (in a population) have EVD less chance of it being passed on

1

(f) **Level 3 (5–6 marks):**

A detailed and coherent evaluation is provided which considers a range of arguments for and against the use of unlicensed drugs and comes to a conclusion consistent with the reasoning.

Level 2 (3–4 marks):

An attempt to give arguments for and against the use of unlicensed drugs is made. 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

- might save some lives
- vaccine could reduce chance of future outbreaks
- patient made aware of risk and agreed to use of drug
- sharing of results could speed up development of effective vaccines / drugs
- used mainly for health workers who were risking their lives to help

cons

- could be dangerous
- or**
- vaccine could harm a healthy person
 - goes against legislation / laws governing drug development
 - might set a precedent for other drugs not to be fully tested
 - unfair as not available to the African people

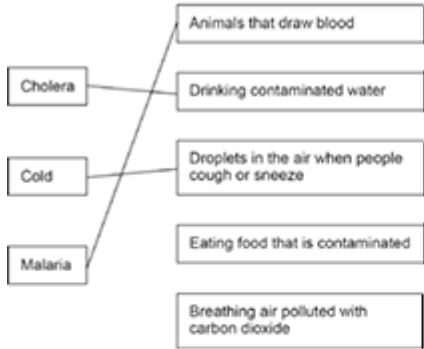
a justified conclusion

6

[13]

5

(a) Disease Way the disease is spread



extra lines from left cancel the mark

3

(b) any **two** from:

- skin acts as a barrier
- blood clots (over cuts)
- nose (hairs) catch particles (breathed in)
- mucus (in trachea / bronchi) traps microorganisms
- acid in stomach kills microorganisms

2

(c) because measles is a virus

1

(d) 28 / twenty eight

± 0.5 small square tolerance

1

(e) 2.5

1

(f) number will decrease

1

less likely to come into contact with someone with measles / the disease

1

[10]

6

(a) 55%

2 marks for correct answer alone

accept 54 – 56

5.5 / 10 × 100 alone gains 1 mark

2

(b) any **three** from:

- amino acids
- antibodies
- antitoxins
- carbon dioxide
- cholesterol
- enzymes
- fatty acid
- glucose
- glycerol
- hormones / named hormones
- ions / named ions
- proteins
- urea
- vitamins
- water.

ignore blood cells and platelets

ignore oxygen

max 1 named example of each for ions and hormones

allow minerals

3

(c) Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also refer to the information in the Marking Guidance and apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a description of pathogens with errors or roles confused.

or

the immune response with errors or roles confused.

Level 2 (3 – 4 marks)

There is a description of pathogens **and** the immune response with some errors or confusion

or

a clear description of either pathogens **or** the immune response with few errors or little confusion.

Level 3 (5 – 6 marks)

There is a good description of pathogens **and** the immune response with very few errors or omissions.

Examples of biology points made in the response:

- bacteria and viruses are pathogens
credit any ref to bacteria and viruses
- they reproduce rapidly inside the body
- bacteria may produce poisons / toxins (that make us feel ill)
- viruses live (and reproduce) inside cells (causing damage).

white blood cells help to defend against pathogens by:

- ingesting pathogens / bacteria / (cells containing) viruses
credit engulf / digest / phagocytosis
- to destroy (particular) pathogen / bacteria / viruses
- producing antibodies
- to destroy particular / specific pathogens
- producing antitoxins
- to counteract toxins (released by pathogens)
credit memory cells / correct description
- this leads to immunity from that pathogen.

6
[11]

7

(a) (i) 64

1

(ii) 36

allow e.c.f from (i) i.e. 100 – answer given in (a)(i)

1

(iii) any **one** from:

- only considers 16-year-olds
ignore lack of evidence
allow does not refer to all ages
- only about some / 5 countries
allow does not refer to all countries.

1

(b) the more exercise done the healthier a person is

allow the more exercise done the higher the health rating
allow the less exercise done the lower the health rating

1

(c) having a high cholesterol level

1

(d) (i) antibodies

1

(ii) antibiotics

1

[7]

8

(a) any **two** from:

- only one 'chromosome'
allow one strand of DNA
- circular
allow loop
- may have plasmids
- not in a nucleus / no nucleus

2

(b) (i) any **one** from:

- London is much higher
or converse
- more variable / wider range
allow 'on average it is 5 / 6 times greater'

1

(ii) increases

Included figures must be correct

1

(iii) overall slight increase

accept 'doesn't change much'

1

variable / goes up and down

1

(c) (i) both axes correctly labelled

x = Year

y = Number of cases

1

correct points

all correct = 2 marks

1-2 errors = 1 mark

> 2 errors = 0 marks

2

suitable line of best fit

accept straight line or smooth curve

1

(ii) doesn't fit the pattern / line of best fit

1

(d) provides immunity / protection (to TB)

ignore 'stops people catching it'

ignore 'resistance'

1

prevents TB spreading
accept ref to herd immunity

1
[13]

9

(a) (i) any **one** from:

- (produce) toxins / poisons
- (cause) damage to cells
kill / destroy cells
allow kills white blood cells

1

(ii) produce antitoxins

1

engulf / ingest / digest pathogens / viruses / bacteria / microorganisms
accept phagocytosis or description
ignore eat / consume / absorb for engulf
ignore references to memory cells

1

(b) (i) dead / inactive / weakened
accept idea of antigen / protein

1

(measles) pathogen / virus
ignore bacteria

1

(ii) (after infection)
accept converse if clearly referring to before vaccination

1

rise begins sooner / less lag time

steeper / faster rise (in number)

1

longer lasting **or** doesn't drop so quickly
idea of staying high for longer
ignore reference to higher starting point

1

(iii) antibodies are specific or needs different antibodies
*accept antigens are different **or** white blood cells do not recognise virus*

1

(c) reduces spread of infection / less likely to get an epidemic
accept idea of eradicating measles

1
[10]

10

(a) (i) viruses live inside cells

1

viruses inaccessible to antibiotic
allow drug / antibiotic (if used)
would (have to) kill cell

1

(ii) any **two** from eg

- non-resistant strains killed (by antibiotics)
- so less competition
- overuse of antibiotics / antibiotics prescribed for mild infections
if no marks gained allow one mark for 'people do not finish course of antibiotics'

2

(b) (stimulate) antibody production
ignore antitoxin

1

(by) white cells

1

rapidly produce antibody on re-infection
ignore antibodies remain in blood

1

[7]