

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 3 - TEST 4

INFECTION AND RESPONSE

Intermediate

Mark schemes

- 1.** bacteria reproduce rapidly / increase rapidly in numbers produce poisons / toxins
each for 1 mark 2 **[2]**
- 2.** (i) kills / destroys bacteria **or**
prevents growth of bacteria
*do **not** allow germs*
*do **not** allow fights or gets rid of* 1
- (ii) any **two** from:

bacteria may be resistant / immune (treatment futile)
or bacteria would not be killed
accept descriptions from table
accept "fights" here
do not accept people resistant

may select for resistant type

may cause increased incidence of resistance or Penicillin less effective in future

sore throat might be due to a virus – Penicillin would not work 2 **[3]**
- 3.** (wbc) ingest / digest pathogens / bacteria / viruses
allow eat germs
ignore swallow germs
ignore ingest the disease
ignore attack / kill the disease 1
- (wbc) produce antibodies 1
- (wbc) produce antitoxins 1

any **one** from:

- (antibodies) destroy or kill pathogens / bacteria / viruses / germs
ignore destroy / kill disease
ignore attack / fight pathogens
- (antitoxins) counteract / destroy / neutralise toxins / poisons
ignore attack / killing toxins
- reasonable reference to memory cells **or** rapid production of antibodies upon re-infection

1

[4]

4.

- (i) 2 of:
ingest microbes;)allow higher level answers
produce antibodies;)allow cause and effect
produce antitoxins)eg antitoxins neutralise poisons = 2
each for 1 mark

2

- (ii) injection of dead/weak microbes;
stimulates antibody production;
these can be produced again quickly on new infection
or remain for long time to 'combat' new infection
each for 1 mark

3

[5]

5.

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

virus is neutral

- resistant to (most) antibiotics
- contagious **or** easily passed on **or** reference to open wounds
- patients ill therefore less able to combat disease

2

- (b) (i) chloride of lime / hand washing killed bacteria (picked up from corpses)
allow disease / germs / infection / disinfectants

1

- (ii) people to wash hands after contact with patient

1

so bacteria / pathogen / MRSA not transferred to other patient

1

[5]

6.

- (a) testing for toxicity / see if it is safe /see if it is dangerous / to see if it works
ignore side effects unqualified

1

- (b) (i) testing for side effects / testing for reactions (to drug)
ignore to see if it works
*do **not** accept dosage* 1
- (ii) any **one** from
ignore immune system
- dose too low to help patient
 - higher risk for patient
 - might conflict with patient's treatment / patient on other drug
 - effect might be masked by patient's symptoms / side effects clearer
- (c) to find optimum dose
*allow testing on larger sample **or** it makes results more reliable*
allow to find out if drug is effective / find out if drug works on ill people (not just if drug works) 1
- (d) (i) (tablet / drug / injection) that does not contain drug
allow control / fake / false
allow tablet / injection that does not affect body
*do **not** accept drug that does not affect body* 1
- (ii) neither patients nor doctors 1

[6]

7.

- (a) virus
bacteria (allow fungi, protozoa) 2
- (b) reference to poisons/toxins produced by microbes 1
- (c) 2 of e.g.
engulf microbes
produce antibodies
produce antitoxins 2
- (d) dead/weakened microbes (relevant to named disease)
method e.g. injection/ swallowed (relevant to named disease)
body responds by producing antibodies 3

[8]

- 8.** (a) lungs
for 1 mark 1
- (b) microbes reproduce rapidly produce poisons
for 1 mark each 2
- (c) viruses/fungi/protozoa
for 1 mark 1
- (d) more likely to come into contact with infected people/more TB bacteria in air
for 1 mark 1
- (e) white cells ingest bacteria
produce antibodies which destroy bacteria
produce antitoxins which counteract poisons produced by bacteria
for 1 mark each 3

[8]

- 9.** (a) any **two** from:
- arthritis
allow damaged joints
 - diabetes
accept high blood sugar
 - high blood pressure
 - strokes
allow blocked blood vessels / thrombosis
 - allow breathing difficulties
ignore cancer
ignore high cholesterol
- 2

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

to gain marks there must be a comparison

ignore comparison at single age

- lower number of women deaths up to age of 75-80
- higher number of women deaths after 80
ignore women die older or men die younger
- men's peak higher
- men's peak at an earlier age
- men's death start earlier than women
- more men than women die of heart disease

2

(ii) any **two** from:

- men smoke more (cigarettes)
ignore alcohol
- more men smoke
- men under more stress
- men less active
- more men overweight / eat more / less diet conscious **or** different fat distribution
ignore reference to body size
- genetic factors
- men might have lower metabolic rate
ignore references to hormones
- men less likely to visit doctor even though they have symptoms

2

(c) *points can be in any order*

laboratory tests / tests on tissues

or

tests on animals

or

tests for toxicity

ignore computer simulations

1

tests for side effects on volunteers / healthy people / small numbers

1

widespread testing

or

testing for optimum dose

or

test on patients / sick people

or

test to see if it is effective

accept use of placebo

1

[9]

10.

(a) don't kill pathogens / bacteria / viruses / microbes / microorganisms

allow don't contain antibiotics

ignore antibodies / attack / fight

allow only treat symptoms / pain

ignore kill disease / germs

1

(b) any **two** from:

• age

• gender

• extent / severity of pain

or how long had pain before trial

• type of pain / illness / site of pain

accept 'the pain' for 1 mark, if neither extent or type given

ignore pain threshold

• (body) mass / weight / height

allow body size / physique

• other medical issues / drugs taken / health / fitness

• ethnicity

2

(c) (i) 75

ignore calculations / %

1

(ii) faster pain relief / decrease

allow pain relief sooner

or *it works quicker*

or *more pain relief at start / in first $1 / 1\frac{3}{4}$ hours*

1

(iii) decrease of pain higher / more

ignore more effective unless qualified by time > $1\frac{3}{4}$

hours allow effect lasts longer

1

decrease of pain is longer lasting

1

(d) any **three** from:

ignore yes or no

(Yes because)

- rapid pain relief (from A)
- long lasting pain relief (from B)
- and it costs less
- the sum of the pain relief (from A + B) is greater (than X)

(No because)

- drug X gives more pain relief
- (A + B / they) might interact with each other
- could result in overdose
- could be more / new side effects

if neither points gained

allow (more) dangerous

3

[10]

11.

(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]