

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B 3 - TEST 5

INFECTION

Advanced

Mark schemes

1.

(a) antibodies;

if incorrect term used then penalise in (a) then regard as continuous error for rest of question

1

(b) antibodies remain (for several years)

or are not removed

*accept last a long time **or** not destroyed*

***or** continues to make antibodies*

***or** causes increased number of antibodies **or** more antibodies*

***or** stays in body **or** person has made own antibodies*

***or** if memory cells named must link to antibody production*

1

(c) antibodies removed (from blood);

*accept destroyed **or***

*unable to make **or***

*replace antibodies **or***

*they are not human antibodies **or***

person has not made own antibodies

1

(d) so more antibodies made;

accept so enough antibodies made

***or** so correct amount of antibodies*

*present **or** to keep antibodies high*

***or** so body keeps making*

antibodies

1

(e) any **two** from

already has tetanus bacteria in body;

*accept could boost infection **or** make it worse*

would take too long **or**

a long time for antibodies to be made;

accept too slow forming antibodies

***or** cannot form correct amount of antibodies*

disease would have effect before

antibodies made;

accept antibodies are specific

***or** will work for one disease but not another*

2 max

- (f) injection of ready made antibodies;
accept does not have to wait for antibody formation or has large amount of antibodies quickly
or has enough antibodies quickly
or antibodies start working straight away

1

[7]

2. (a) vector

1

- (b) any **three** from:
- destroy the snails
 - isolate infected dogs
 - treat infected dogs
allow vaccination
 - educate owners about picking up dog faeces

3

- (c) stop mosquitoes breeding
allow correct description

1

use mosquito nets
allow use of insect repellent

1

[6]

3. (a) engulf bacteria
 produce antibodies
 produce antitoxins
 effect of antibodies/antitoxins
for 1 mark each

4

- (b) method must be related to disease
 dead/weakened microbes (as appropriate)
 stimulate antibody production
 antibody production rapid if microbe enters again
for 1 mark each

3

[7]

4.

(a) any **two** from:

- regular hand washing
- **or**
use hand sanitiser / alcohol gel
- cover nose / mouth when coughing / sneezing
allow wear a face mask
- put used tissues (straight) in the bin
- don't kiss uninfected people
allow isolate patient from others
- **or**
don't share cutlery / cups / drinks with uninfected people
- clean / disinfect / sterilise surfaces regularly
ignore responses referring to infected people

2

(b) any **three** from:

- stimulate (mouse) lymphocytes to produce antibody
for marking points 1 and 2 lymphocyte must be used at least once
- combine (mouse) lymphocyte with tumour cell
- **or**
(create a) hybridoma
- clone (hybridoma) cell
- (hybridoma) divides rapidly **and** produces the antibody

3

(c) any **two** from:

- (monoclonal) antibody binds to virus **or** antibody binds to antigen on surface of virus
- (monoclonal) antibody is complementary (in shape) / specific to antigen (on surface of virus)
- white blood cells / phagocytes kill / engulf the virus(es)

2

(d) as a control

or

to see / compare the effects of the treatment (vs. no treatment)

1

(e) $(4.8 + 10.4) \div 2 \div 100 \times 1500$

or

$(4.8 \div 100 \times 750) + (10.4 \div 100 \times 750)$

1

114

an answer of 114 scores 2 marks

allow 228 for 1 mark

1

- (f) **(supports the conclusion because)**
over double the number / % of patients (in the trial) were hospitalised with the placebo
(compared to MAB)

1

(does not support the conclusion because)

no information on patients not hospitalised / still unwell at home

or

other factors may have affected those admitted to hospital

allow correct named factor e.g. age / gender / other illness

or

don't know if it was a double blind trial

1

[12]

5.

- (a) shape of antibody is not complementary;

*accept shapes of antibody and antigen do not match or antibody
does not correspond to antigen **Y** or is not the same shape as
antigen **Y** or antibody different shape*

1

so unable to attach or join to antigen **Y**

accept they do not fit

1

- (b) (i) antibodies in blood or in skin or in body;

accept already have the antibodies

1

react with (injected) antigens or bacteria;

*accept skin affected by antigen-antibody complex or blood vessels
in skin enlarge or dilate*

do not accept attack instead of react

1

- (ii) any **three** from

bacteria weak so do not cause disease

accept not harmful

do not accept bacteria are dead

cause antibody production;

memory cells remain;

accept a suitable description

so body can quickly produce more antibodies in a real infection;

accept antibodies remain in blood or in body

3

[7]

6.

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

- cells
- tissues
- (live) animals / named
allow mammals

1

(ii) any **three** from:

(to test for)

- toxicity / check not poisonous / not harmful
allow side-effect
allow converse
- interaction with other drugs
- efficacy **or** to see if they work **or** check if they treat the disease
allow converse
- dosage **or** how much is needed

3

(b) **argued evaluation**

*comparison can be written anywhere in evaluation allow use of 'only' for implied comparison for each point eg **only** statins damage muscles / kidneys / organs*

any **six** from:

- statin can damage / muscles / kidneys / organs but cholesterol blockers don't
ignore liver
if neither of the first 2 points are given accept for 1 mark
- statins can cause death but cholesterol blockers don't
*statins are more dangerous than cholesterol blockers **or** statins have more side effects*
- cholesterol blockers can interfere with action of other drugs but statins don't
- statins are for a life time but cholesterol blockers are not
- statins (might) reduce cholesterol to zero but cholesterol blockers only reduce it **or** statins reduce cholesterol more
allow statins (might) stop membrane / hormone production but cholesterol blockers don't

- statins better for people with inherited high cholesterol
- cholesterol blockers better for people with dietary cholesterol problems
- taking/using statins/cholesterol blockers is better than dying from heart attack or build up of fat in blood vessels or reduced blood flow

6

[10]

7.

(a) (bacteria) produce toxins / poisons

1

(viruses) damage / kills cells **or** toxins released from cell

1

(b) any **two** from:

- viruses live inside cells
- viruses inaccessible to drug
- drug would damage body cells / tissue

2

(c) any **four** from:

- overuse of antibiotics
- bacteria mutate
*do **not** allow antibiotic causes mutation*
- antibiotics kill non-resistant strains **or** idea of selection
- reduced competition
- resistant bacteria reproduce

4

[8]

8.

(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]