AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



MARK SCHEME

4.3.1 COMMUNICABLE DISEASES (PACK 3)

SCORE	PERCENTAGE
/126	%

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Q1.

(a) antibiotics diffuse / pass (into agar)

*do **not** allow into dish*

1

kill / prevent growth of bacteria or destroy cell wall / bacteria

accept bacteria are dead

1

(b) it / higher concentration kills more bacteria **or** causes less growth

*do **not** accept anything referring to size of circle*

1

levels off (at 6 units)

accept above 4 units

1

(c) **Quality of written communication**:
for correct sequencing or linking of ideas or points

this mark can only be awarded for a plausible attempt (not necessarily biologically correct) to link a precaution to a purpose

Q ✓ or Q ✗

1

Loop flamed

to sterilise it / kill unwanted microorganisms

*accept so no bacteria present do **not** accept to clean it*

1

Lid taped

prevent bacteria getting in / out **or** prevent someone touching bacteria

accept microorganisms/fungi for bacteria
*do **not** accept viruses or germs*

1

25°C

prevents / reduces growth of / reproduction

1

harmful bacteria / microorganisms or pathogens

1

(d) any **two** from:

- to avoid over-use of antibiotics **or** use no / less / low concentration antibiotics
- select antibiotic that is most effective
- finish the course

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- don't give or use for animals
- develop new antibiotics **or** alternatives

2

[11]

Q2.

(a) decrease in number of deaths (after vaccination started)

1

(b) <u>in correct sequence</u>:

bacteria

1

white blood cells

1

antibodies

1

[4]

Q3.

Quality of written communication

*for correct use of at least **two** scientific terms eg mutation, resistant (**not** just 'antibiotic-resistant', **not** 'immune') / selection / natural selection / survival / reproduction / gene / allele / DNA*

1

any **two** from:

mutation occurs in bacteria or change in DNA / gene occurs

cancel if mutation 'caused by' antibiotic

(when antibiotic used) only resistant bacteria survive **or** non-resistant bacteria are killed **or** reference to 'natural selection'

resistant bacteria pass on the gene / allele

allow pass on the mutation
*do **not** accept just 'pass on resistance'*

2

[3]

Q4.

(a) measles mumps rubella / German measles

any order

1

(b) **Quality of written communication**:

*for giving at least **two** statements linked to vaccination*

1

any **four** from:

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*NB max **3** marks for only one side of argument*
*do **not** accept economic argument*

a valid reference to pain
eg pain of vaccination / disease

should

protect against diseases

measles / mumps / rubella are dangerous diseases / can cause lasting harm / death

cannot be treated by antibiotics

problem of epidemics

should not

may suffer autism / damage to mental / social development

may suffer large intestine disorders

separate vaccines available that cause no / less problems

4

[6]

Q5.

(i) the loop is sterilised
accept to <u>kill</u> anything on the loop

or
to kill any bacteria on it;
do not credit to clean the loop

1

(ii) if hot it would <u>kill bacteria picked up</u> (from culture);
accept 'microorganisms' or 'microbes'
accept entry of <u>contaminated</u> air but reject entry of air unqualified

1

(iii) to prevent entry (from the air) of unwanted bacteria or bacterial spores or fungal spores;
accept so can't breath on it
accept 'microorganisms' or 'microbes'

1

(iv) so that the (petri) dish is not opened (after bacteria are cultured)
or to reduce evaporation
or drying of the agar,
accept 'microorganisms' or 'microbes'
accept to prevent anything relevant getting in/out
reject references to spillage

1

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[4]

Q6.

(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*
***o**r 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;

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*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]

Q7.

(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) <u>antibodies</u> in blood or in skin or in body;

accept already have the antibodies

1

<u>react</u> with (injected) antigens or bacteria;

*accept skin affected by antigen-antibody complex **or** blood vessels <u>in skin</u> 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]

Q8.

mutation or description of mutation (gives resistance to penicillin)

1

<u>some</u> survive (penicillin)

1

(survivors) reproduce **or** multiply

1

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asexual reproduction **or** binary fission **or** cloning

accept mitosis

1

gene for resistance **or** the mutation is passed on (to offspring)

allow reference to bacteria being immune

ignore reference to survival of fittest

1

[5]

Q9.

(a) droplet infection **or** aerosol infection

*do **not** accept airborne*
accept airborne droplets

1

(b) so there is no large group which could catch the infection/pass on the infection

converse – if large numbers can't pass it on the virus is less likely to reach those few who are susceptible

1

(c) (i) any **four** of the following points:-

example of a 3 mark answer: Lymphocytes produce specific antibodies…...

comment on specificity applied to antibodies or lymphocytes

(recognition by) lymphocytes;

(white cells) make antibodies;

antibodies destroy/neutralise the virus/antigen/protein subunit;

*do **not** accept antibodies KILL viruses*

accept white blood cells replicate

accept some white cells form memory cells/live a long time;

accept subsequent infection results in very rapid antibody production;

max 4

(ii) active;

1

(d) any **three** of the following points

Structure change in:
protein for binding to host cell;

accept changes in surface proteins (of protein coat)

spike containing enzyme;

changes in antigen

Fit: existing/circulating/old antibodies don't match new virus strain shape/new antigen/new binding protein;

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Wrong antibodies: injection does not stimulate antibodies against all strains/different antigens;

accept wrong antibodies for 1 mark

max 3

[10]

Q10.

blood clots to seal cuts;
kills microbes which enter

each for 1 mark
(allow higher level answers)

[2]

Q11.

(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]

Q12.

(a) use antibiotics; or named one to kill bacteria; (not microbes)

each for 1 mark

2

(b) some ingest/digest bacteria (not microbes) OWTTE
some produce antibodies;
which destroy bacteria/viruses;
some produce antitoxins;
which counteract poisons released by bacteria

each for 1 mark

5

[7]

Q13.

(a) engulf bacteria
produce antibodies
produce antitoxins
effect of antibodies/antitoxins

for 1 mark each

4

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(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]

Q14.

(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]

Q15.

(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]

Q16.

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(a) white cells ingest bacteria
produce antibodies which destroy bacteria
produce antitoxins which counteract poisons produced by bacteria
for 1 mark each

3

(b) dead/mild microbes
stimulate antibody production
white cells can quickly produce these again
for 1 mark each

3

(c) adds more bacteria (mild)
does not affect TB bacteria
for 1 mark each

2

[8]

Q17.

(a) microbes entered body,
multiplied rapidly,
made poisons
any 2 for 1 mark each

2

(b) contact with infected people
for 1 mark

1

(c) the body kills the microbes
for 1 mark

1

[4]

Q18.

(a) (i) white blood cells
for 1 mark

1

(ii) e.g. contact with infected person unhygienic conditions
for 1 mark each

2

(iii) broken down, by enzymes into amino acids
any 2 for 1 mark each

2

(b) reproduce rapidly produce toxins
for 1 mark each

2

(c) antibiotic or named
for 1 mark

1

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(d) mild or deal microbes introduced white cells produce antibodies
which can destroy disease microbes
idea of memory cells
idea that injecting antibodies give immediate production

any 3 for 1 mark each

3

[11]

Q19.

bacteria reproduce rapidly / increase rapidly in numbers produce poisons / toxins

each for 1 mark

2

[2]

Q20.

bacteria reproduce rapidly / increase rapidly in numbers
produce poisons / toxins

each for 1 mark

[2]

Q21.

(a) **Quality of written communication**
The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme

idea of mutation ***or*** variation

*do **not** allow 'bacteria get used to antibiotics' **or** idea that antibiotics change the bacteria **or** 'bacteria become immune' **or** references to adaptation or evolution*

1

(resistant cells) survive antibiotic

1

(resistant cells) breed

1

(b) **EITHER** (yes)

keep animals disease free (1) so grow faster (1 mark) **or** live longer

OR (no)

resistant bacteria may develop (1)
risk to human **or** animal health (1)

allow bacteria become resistant / immune

2

[5]

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