AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



MARK SCHEME

4.3.1 COMMUNICABLE DISEASES (PACK 1)

SCORE	PERCENTAGE
/305	%

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Q1.

(a) phloem

1

(b) translocation

1

(c) either:

less (sugars for) respiration

1

(so) less energy released

1

or

less amino acids made (1)

(so) less protein produced **or** less protein synthesis (1)

or

less cellulose made (1)

(so) weaker cell walls (1)

(d) (aphids) can fly to another plant **or** part of the plant

ignore to fly unqualified

1

to get (more) food

allow to find a mate
allow idea of less competition for food
allow to escape predators
*do **not** accept escape prey*

1

(e) (oil) prevents aphids from attaching to leaf **or** causes aphids to slide off leaf

ignore 'the leaf is slippery'

or
idea that oil may harm / kill the aphid

allow oil may be unpleasant to the aphid

1

(f) (plant / stem has) thorns

allow spines / spikes / prickles
ignore stings
*do **not** accept thorns protect (the plant) from predators*

1

(g) C

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if any other letter given then no marks for the question

1

(fungi / spores) blown by / in direction of the wind

allow black spot / disease is blown by / in direction of the wind

or

it's the closest plant (to A)

*do **not** accept reference to bacteria / viruses / pollen being blown*

1

(h) any **one** from:

- spread rose bushes out more

  allow isolate the infected plant
  allow idea of barrier around infected plant
  ignore separate unless qualified

- remove any infected parts of the plant

  allow remove infected plant / A

- use a fungicide

  ignore pesticide
  *do **not** accept insecticides / herbicide*

1

[11]

Q2.

(a) toxins / poisons (secreted by / from / in bacteria)

1

(b) any **two** from:

- wash hands after using toilet / being sick
  or
  wash hands before preparing / handling food
  or
  do not prepare food (whilst infected)

  ignore 'wash hands' unqualified
  ignore reference to coughing / sneezing

- isolate yourself

  allow examples of how isolation could be achieved

- disinfect clothes / surfaces

- do not share utensils / cutlery / towels

2

(c) antibiotics

allow named examples of antibiotics

1

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(d) immune system is damaged / weakened **or** immune system doesn't function properly

allow immunocompromised
allow lack of / no white blood cells

1

white blood cells cannot kill bacteria / *Salmonella* (as effectively)

allow no / fewer antibodies so bacteria not killed
***or** less phagocytosis so bacteria not killed **or** no / fewer antitoxins to counter toxins*

1

(e) any **one** from:

- (give chickens) antibiotics
  allow (give chickens) monoclonal antibodies
- don't sell infected chickens / eggs
  allow don't sell the chickens / eggs
  ignore don't sell chickens / eggs
- keep infected chickens isolated / indoors
  allow keep the chickens indoors
  ignore keep chickens indoors
- slaughter the infected chickens
  ignore vaccination / chlorination / disinfection

1

(f) (cleaning liquid) B
and
greater reduction in number of bacteria (after cleaning) in both locations

ignore few bacteria in both locations
*allow neither / both **and** idea of experimental error*

1

(g) radius (of area with no bacteria growing)

allow diameter (of the area with no bacteria growing)
ignore πr^2 unqualified
allow idea of placing agar plate onto graph paper and counting the squares not covered with bacteria

1

(h) repeat **and** look to see if results are similar

ignore repeat unqualified
*allow repeat **and** look to see if results are different*
allow repeat and see if there are anomalies
ignore repeat and identify anomalies
ignore repeat and compare unqualified

1

(i) any **one** from:

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- toxicity / side / health effects

  ignore harmful / dangerous
  allow reference to allergies

- effect on other types of bacteria / pathogens

  allow not tested on other types of bacteria
  ignore germs

- interaction with other cleaners
- ease of use
- dilution factor of each cleaner (vs. cost)

  ignore concentration unqualified

- time cleaner is effective for

  ignore how long the cleaner lasts for

  allow reference to odour of cleaning liquid

  ignore reference to cost unqualified
  ignore environmental effects / flammability

1

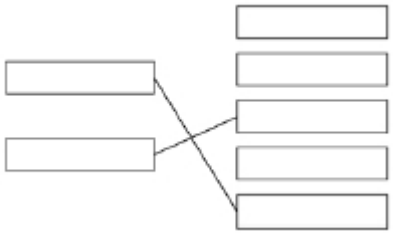
[11]

Q3.

(a) bacteria

1

(b)



extra line from a drug negates the mark for that drug

2

(c) any **one** from:

- to check they are safe
- to check they are effective

  allow to check they work or to check for the (right) dose

- to check for side effects

  allow to check for toxicity

1

(d) testing on healthy volunteers

1

(e) **Level 2 (3-4 marks):**
Relevant points (reasons / causes) are identified, and there are attempts at logical linking.

Level 1 (1-2 marks):

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Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

0 marks:
No relevant content

Indicative content
- dead / inactive pathogen
- introduced to the body
- white blood cells respond
- produce antibodies
- antibodies are specific to pathogen
- antibodies produced quickly (on reinfection) / rapid response
- in larger quantities
- killing the pathogen

[9]

Q4.

(a) a fungus

1

(b) **Level 3 (5-6 marks):**
Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

Level 2 (3-4 marks):
Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

Level 1 (1-2 marks):
Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

Level 0
No relevant content

Indicative content

	defence	**description of defence**
animals	skin	sebum / oils to kill microbes dead layer difficult to penetrate
	nose	hairs keep out dust and microbes
	trachea / bronchi	mucus traps microbes cilia moves mucus
	stomach	(hydrochloric) acid kills bacteria
	white blood cells	produces antibodies produces antitoxins engulf microbes / phagocytosis

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plants	cell wall	tough / difficult to penetrate
	waxy cuticle	tough / difficult to penetrate
	dead cells / bark	fall off, taking pathogens with them
	production of antibacterial chemicals	kill bacteria
fungi	antibiotic production	kill bacteria

6

(c) any **three** from:
- sterilise agar (before use)
- sterilise (Petri) dish before use
- disinfect bench (before use)
- pass inoculating loop (through flame)
- secure lid with (adhesive) tape
- minimise exposure of agar / culture to air / lift and replace lid as quickly as possible

allow:
- *dip loop into ethanol (after flaming)*
- *keep the lid on the plate for as long as possible*
  or
  minimise exposure of agar to air
  or
  only tilt the lid off (rather than remove it)
- *flame the neck of the bottle*

3

(d) to prevent the growth of a harmful pathogen

1

[11]

Q5.

(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

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- 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) ÷ 2 ÷ 100 × 1500
or
(4.8 ÷ 100 × 750) + (10.4 ÷ 100 × 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

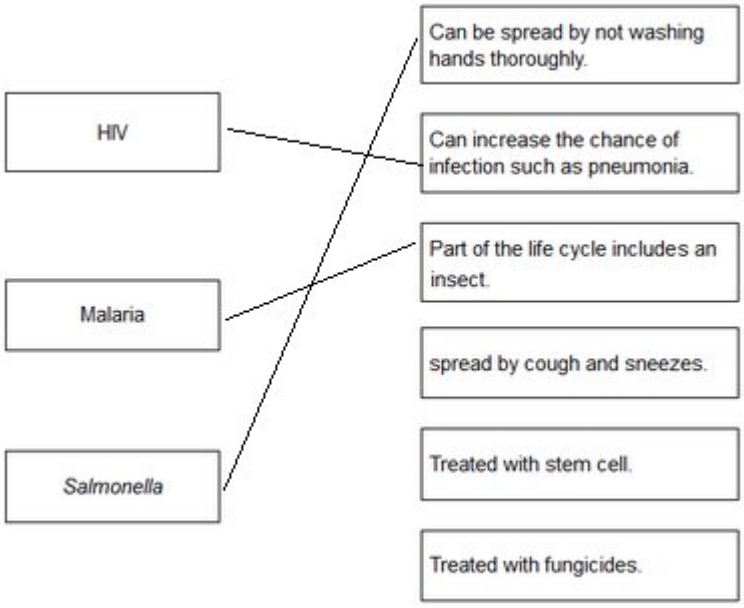
1

[12]

Q6.

(a)

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each extra line negates a mark

4

(b) pain when urinating

1

yellow discharge

1

(c) three correct plots

*allow **1** mark for two correct plots*

2

correctly drawn line

1

(d) any **three** from:

- (fairly) level / steady up to 2009

  *allow numbers of males fall (slightly) **and** females rise (slightly) up to 2009*
- (there is a) rise after 2009
- males are (always) higher than females
- males rising faster than females

  allow overall increase (from 2005 to 2013)

3

(e) HIV is a virus

1

(and) antibiotics are <u>only</u> effective against bacteria
or
antibiotics do not kill viruses

allow viruses live inside cells

1

[13]

Q7.

(a) to kill virus

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or
to prevent virus spreading

1

(b) take (stem) cells from meristem
or
tissue culture

allow take cuttings

1

(c) use Benedict's solution

1

glucoses turns solution blue to orange

1

(d) **Level 2 (3–4 marks):**
A detailed and coherent explanation is provided. The student makes logical links between clearly identified, relevant points that explain why plants with TMV have stunted growth.

Level 1 (1–2 marks):
Simple statements are made, but not precisely. The logic is unclear.

0 marks:
No relevant content.

Indicative content
- less photosynthesis because of lack of chlorophyll
- therefore less glucose made
  so
- less energy released for growth
- because glucose is needed for respiration
  and / or
- therefore less amino acids / proteins / cellulose for growth
- because glucose is needed for making amino acids / proteins / cellulose

4

[8]

Q8.

(a) any **two** from:
- acid in the stomach kills pathogens in food
- skin forms a barrier / produces antimicrobial secretions
- hairs in the nose trap (particles which may contain) pathogens
- trachea / bronchi has mucus which traps pathogens
  or
  bronchi have cilia which waft mucus to throat to be swallowed

2

(b) **Level 3 (5–6 marks):**
A clear, logical and coherent answer, with no significant redundancy. The student understands the process and links this to reasons for clinical trials.

Level 2 (3–4 marks):
A partial answer with errors and ineffective reasoning or linkage.

Level 1 (1–2 marks):

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One or two relevant points but little linkage of points or logical reasoning.

0 marks:
No relevant content.

Indicative content
- pre-clinical trials of the new drug on cells / tissues / live animals
- to test toxicity, dosage and efficacy
- clinical trials / test on healthy volunteers and Ebola patients at very low doses
- so that you can monitor for safety / side effects
- and only then do trials to find the optimum dosage and test for efficacy
- double blind trial / use of placebo
- which does not contain the new drug
- random allocation of Ebola patients to groups
- so no one knows who has placebo / the new drug
- peer review of data
- to help prevent false claims

6

[8]

Q9.

(a) stomach and pancreas correctly labelled

1

(b) bacteria not killed (by stomach acid / HCl) and so they damage mucus lining

1

so <u>acid / HCl</u> damages stomach tissue / causes an ulcer

allow bacteria infect stomach tissue

1

(c) if the cancer is malignant

1

(cancer) cells can spread to other organs

1

via the blood forming a secondary tumour

do not award marking points 2 or 3 without marking point 1

1

(d) add Biuret reagent to food sample

allow sodium / potassium hydroxide (solution) + copper sulfate(solution)

1

mauve / purple colour shows protein present

1

(e) damaged villi reduce surface area for absorption (of food molecules)

1

(therefore) fewer amino acids and glucose absorbed

1

with less glucose transfer of energy from respiration is reduced

1

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and fewer amino acids available to build new proteins

1

[12]

Q10.

(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]

Q11.

(a) (i) small amounts of dead pathogens

1

(ii) decrease

1

by 60 (%)

allow from 70(%) to 10(%)

allow other correct data treatment

1

(b) (i) penicillin

1

(ii) any **two** from:
- antibiotics only kill bacteria
  allow antibiotics do not kill viruses
- some bacteria are resistant (to antibiotics)
  allow MRSA not killed by antibiotics
- (correct) antibiotics not always used
  allow course not completed
- deficiency disease(s) not caused by bacteria **or** cannot be treated by antibiotics
- inherited disease(s) not caused by bacteria **or** cannot be treated by antibiotics
- 'lifestyle' diseases not caused by bacteria **or** cannot be treated by antibiotics
  eg heart disease / cancer

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*if no other mark given allow **1** mark for not all diseases are caused by bacteria **or** some diseases are caused by viruses*

2

(c) bacteria grow faster

allow this is body temp (at which pathogens grow)

1

[7]

Q12.

(a) 0.67(%)

allow $0.\dot{6}$ or 0.7

*allow **1** mark for evidence of* $(2 \times 10^6) \div (3 \times 10^8)$

or

*allow **1** mark for 0.0067 or 0.6*

2

(b) (i) idea that food chains start with plants / producers

*allow food chains do not start with animals **or** larvae are consumers*

1

idea that these make food (for other organisms in the chain)

*allow idea that plants / producers photosynthesise **or** plants / producers get energy from the sun*

*allow mosquito larvae do not make food / photosynthesise **or** mosquito larvae do not get energy from the sun*

1

(ii) any **four** from:

- reasoned argument for **or** against release
  *must refer to at least one advantage and one disadvantage. max **3** marks for either only advantages **or** only disadvantages*

advantages:

- fewer mosquitos biting **or** spreading malaria
- fewer people get / die from malaria
  allow people won't get / die from malaria
- lower medical costs (for those infected **or** for treatment) **or** less healthcare needed
- better economically for developing / tropical countries.

disadvantages:

- fewer crops reproduce
  allow fewer crops pollinated
- poorer crop yield
- possible starvation (of people)
- high cost of GM production / mosquito release
- less food for bats / birds **or** bats / birds die
  *allow disruption to food chain / ecosystem **or** reduction of biodiversity*
- gene could 'escape' into other wildlife / species
  ignore into plants

4

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(iii) any **three** from:

- gene from bacteria cut out
  allow allele for gene
- ref to enzymes (anywhere in process)
  allow at any point in process, ie in cutting or in splicing
- (gene) transferred to chromosome of mosquito
  allow DNA for chromosome
- at an early stage of development
  allow egg / embryo

3

[11]

Q13.

(a) immune system

allow white blood cells / lymphocytes

ignore phagocytes

1

produces antibodies

1

(which) attack the antigens on the transplanted organ / pancreas

*allow transplanted organs have foreign antigens at start of explanation **and** linked to attacking the organ*

1

(b) (i) change / rise detected by the sensor

1

information used to calculate how much insulin she is going to need (bring her blood glucose back to normal)

1

(pump delivers) insulin into the blood

1

(causing) glucose to move into cells

allow (liver) converts glucose to glycogen

1

max 2 if no ref. to artificial pancreas

(ii) any **one** from:

- it is more accurate **or** less chance of human error
- (glucose) level will remain more stable **or** no big rises and falls in blood sugar levels
- you don't forget to test and / or inject insulin
- if ill or in coma insulin is still injected

ignore continuous and automatic unqualified

1

[8]

Q14.

(a) 55%

***2** marks for correct answer alone*

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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

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- 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]

Q15.

(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]

Q16.

(a) leprosy

allow bone / blood cancer
ignore cancer

1

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(b) (i) 6 / six

1

(ii) from 1120 to 5600

allow from 5600 to 1120

allow 4480 (alone)

1

(c) any **one** from:

ignore side effects, eg allergies

ignore safety / harm unqualified

- (test for) toxicity

  allow poisonous
- (test for) dosage

  allow idea of amount
- (test for) efficacy.

  allow to see if it works

  allow to check for interaction with other drugs

1

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

ignore reference to cost / addiction

- more people take / use legal / non-prescribed drugs
- legal / non-prescribed drugs are (more) readily available
- alcohol causes liver / brain damage

  or

  tobacco causes cancer.

  allow harmful effects of other named legal non-prescribed drugs

2

(ii) addiction / dependency

allow withdrawal or examples of symptoms of withdrawal (if attempting to stop)

1

[7]

Q17.

(a) microorganism / bacteria / virus / fungus that causes (infectious) disease

1

(b) reduce / stop use of (current) antibiotics

1

(reduce / stop use) for non-serious / mild / viral infections

allow ensure course is completed

allow use of variety of antibiotics

1

(c) (i) 40 °C

1

(ii) any **one** from:

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- microorganisms grow / reproduce / work / act faster
- results / product acquired sooner

1

[5]

Q18.

(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)

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ignore 'stops people catching it'
ignore 'resistance'

1

prevents TB spreading

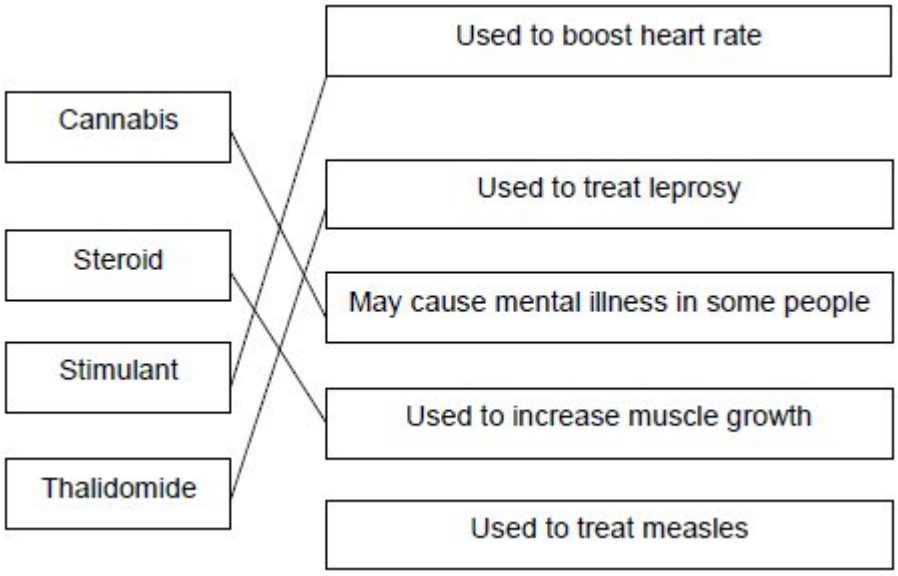
accept ref to herd immunity

1

[13]

Q19.

(a)



extra line from any drug cancels that mark

4

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

- (live) animals
  accept named examples, eg mice
  ignore people / volunteers
- cells
- tissues
  *do **not** allow plants*

1

(ii) to check that the drug works

1

to find the best dose to use

1

(iii) only scientists at the drug company

1

(c) (i) 420

1

(ii) statin(s)

1

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(iii) any **one** from:

- side effects
  allow cost
- other medication
  allow patient choice
- other (medical) conditions
  *allow family history **or** age*

1

[11]

Q20.

(a) mumps

in either order rubella / German measles
both needed for the mark
ignore measles unqualified

1

(b) (i) 80(.0)

*allow **1** mark for* $\frac{504}{630}$ ***or** 0.8*

2

(ii) less chance of epidemic / pandemic

or

less chance of spread of disease / measles / mumps / rubella
allow idea of herd immunity (increased protection for those who are not vaccinated)
*ignore less chance of getting the disease **or** to eradicate the disease*

1

(c) (i) dead / inactive pathogens / viruses / bacteria
allow antigens / proteins from pathogens / viruses / bacteria
ignore microorganisms

1

(ii) white blood cells produce antibodies

1

antibodies produced rapidly (on re-infection) **or** response rapid (on re-infection)
allow ecf if antibodies incorrectly identified in first marking point

1

these antibodies kill pathogens / viruses / bacteria
*do **not** accept idea that original antibodies remain in blood and kill pathogens*

1

(d) (i) antibiotics don't kill viruses

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allow antibiotics only kill bacteria

1

(because measles) virus / pathogen lives inside cells

*allow antibiotics do not work inside cells **or** killing virus / pathogen would kill / damage cell*

1

(ii) (bacteria / pathogens) develop resistance (to antibiotic)

ignore reference to immunity

ignore viruses develop resistance

1

[11]

Q21.

(a) pathogens

1

(b) (i) A disease affecting people in many countries

1

(ii) birds fly / migrate

accept converse

OR

human contact with birds more likely

birds not contained / difficult to control movement

OR

there are more birds (than pigs)

1

(c) (i) antibiotics (only) kill bacteria

ignore flu is caused by a virus unqualified

OR

antibiotics don't kill viruses

ignore virus resistant / immune

1

(ii) painkillers

accept any correct named painkiller, eg aspirin or paracetamol

allow antivirals / Tamiflu

ignore medicine / tablets

1

(iii) resistant

1

bacteria

1

in this order

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[7]

Q22.

(a) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) 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 brief description of at least one of the stages (pre-inoculation, inoculation, post-inoculation).

Level 2 (3-4 marks)
There is a simple description of at least two stages and an explanation of at least one of them.

Level 3 (5-6 marks)
There is a clear description of all three stages and an explanation of at least two of them.

Examples of Biology points made in the response:

Pre-inoculation

- Petri dish and agar sterilised before use
- to kill unwanted bacteria
- inoculating loop passed through flame / sterile swab
- to sterilise / kill (other) bacteria

Inoculation

- loop/swab used to spread/streak bacterium onto agar

Allow other correct methods, eg bacterial lawns

- lid of Petri dish opened as little as possible
- to prevent microbes from air entering

Post-inoculation

- sealed with tape
- to prevent microbes from air entering
- incubate
- to allow growth of bacteria

6

(b) (i) bacteria killed / destroyed

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ignore fights / attacks / stops growth / got rid of

1

(ii) *Might be correct*

largest area / space where no bacteria are growing

allow most bacteria killed

1

Might not be correct

(need more evidence as) D may be harmful to people / animals / surfaces

ignore ref to cost / dangerous or harmful unqualified

1

or may work differently with different bacteria

or disinfectants may be different concentrations

ignore different amounts of disinfectant unless reference to different drop size

or may not last as long

ignore take longer to work

allow reference to anomalous result or not repeated

[9]

Q23.

(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)

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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]

Q24.

(a) antibodies

1

antitoxins

1

antibiotics

1

(b) any **two** from:

- measles
- mumps
- rubella / German measles

2

(c) less / low / no chance of getting named or all condition(s) if vaccinated

1

quantitative figure(s) eg 5 times less likely to get convulsions

1

[7]

Q25.

(a) (i) viruses live inside cells

1

viruses inaccessible to antibiotic

allow drug / antibiotic (if used)

would (have to) kill cell

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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]

Q26.

(a) 40 – 60 hours

1

(b) (i) decrease

1

1st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to 0 / faster after 4 – 10h

1

(ii) oxygen after glucose

extra box ticked cancels 1 mark

1

oxygen less than glucose

1

(iii) respiration

1

[6]

Q27.

(a) (i) decrease

1

rate of decrease slows

1

(ii) any **one** from:

- more use of disinfectant

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allow any reasonable increase in hygiene or sterilisation precautions

- more use of hand washing
- more careful / more often cleaning of patient facilities
- raised awareness / education about hygiene

1

Explanation:
stops / reduces the bacteria being transferred / spreading

1

(iii) 800 – 500 / 800 × 100 =

1

37.5 (%)

*correct answer with or without working gains **2** marks*

1

(iv) any **one** from:

- numbers quite low now so hard to reduce further
- was a big campaign / much publicity (in 2009) so more people already doing it
- hygiene / cleaning now good so hard to improve
- hospitals short of money so less staff to clean

1

(b) mutation occurred giving resistance (to methicillin)

*do **not** accept overuse caused mutation*

1

resistant bacteria not able to be treated / not killed

1

these bacteria multiplied / reproduced / spread quickly

1

[10]

Q28.

(a) sporozoites (from mosquito saliva) divide / multiply / reproduce

ignore schizonts
*do **not** accept sexual reproduction*

1

become thousands / many (of merozoites)

1

merozoites released (from liver) into blood / red blood cells

1

(b) any **three** from:

*answer must include at least one pro **and** one con for full marks*

- reduces incidence of disease **= pro**
- success in mice indicates likely success in humans **= pro**

accept stops people getting malaria

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- but success in mice does not ensure success in humans **or** needs to be trialled in humans
  or need to check for side effects **= con**
- removal of genes should prevent parasite multiplying in liver **or** release of parasites into blood **= pro**

  allow you should not get malaria / the disease from these parasites
- the injected parasite stimulates antibody production **= pro**
- but still possible danger since living parasite injected into human **= con**
- possible liver damage **= con**

3

[6]

Q29.

(a) (i) lower percentage (of women) who died

allow fewer (women) died

1

numerical reference to a pair of figures to show this

allow any difference in a pair of figures

1

(ii) doctors were not <u>transferring</u>

ignore reference to nurses

1

pathogens / bacteria / viruses / microorganisms / microbes

allow fungi

ignore disease / germs / infection

1

(b) any **three** from:

- lower percentage of patients died (when doctors washed hands or in ward A)

  allow fewer for lower percentage
- large decrease or reference to proportional decrease

  ignore raw data
- little / no difference / similar to ward B
- continued drop (in ward A)

3

(c) any **two** from:

- better understanding / knowledge <u>of immunity</u>

  accept ref to immunisation / vaccination
- better / new drugs

  accept examples, e.g. antibiotics / penicillin (discovered)

  allow better / new medicines

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- sterilisation of equipment **or** isolation of patients **or** some infectious diseases wiped out **or** earlier identification / treatment of infections

  ignore references to general hygiene

2

[9]

Q30.

(a) (i) 25°C

1

(ii) pathogens

1

(b) **D**

1

more / most bacteria killed

accept biggest area / ring where no bacteria are growing

1

(c) viruses live inside cells

1

[5]

Q31.

(a) (i) addictive

allow addicting / addict / addicted / addiction or similar

allow phonetic spelling
*do **not** accept / additive / addition*

1

(ii) junction / gap / space between neurones

allow nerve cells / nerves for neurones

allow idea where neurones /
nerve cells / nerves meet / join

1

(b) (i) tablet with no drug

accept answers that convey this idea eg fake / dummy / sugar pill

allow injection with no drug

ignore drugs that don't work.

1

(ii) for comparison

accept to see if drug / it works

*allow to see psychological effect **or** make sure, it is not all in the mind*

allow as a control

ignore 'to make test fair / unbiased'

1

(iii) Neither doctors nor volunteers

1

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(iv) any **two** from:

- age (range)
- sex / gender (mix)
- previous smoking habits **or** eg number smoked (before trial) **or** length of time smoked
- number in the group
- other drugs being taken **or** general health **or** height / weight / BMI / lifestyle / fitness

ignore factors already controlled

*ignore reference to all smokers **or** all want to give up*

2

(c) higher percentage / number of smokers who had stopped smoking (than Drug B)

answers must refer to data and be comparative

allow best results / most effective

ignore best drug unqualified

ignore references to 12 weeks / 1 year

1

[8]

Q32.

(a) both lead to reduction / fall (in measles cases)

can be implied

1

measles vaccine caused a big drop **or** correct use of figures

1

MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures.

1

(b) mump(s)

1

rubella / german measles

either order

allow phonetic spelling

1

(c) white blood cells

allow lymphocytes / leucocytes

ignore memory cells

1

(wbc) produce antibodies

ignore antitoxins / antigens / antibiotics / engulfing

1

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in future / if re-infected antibody production rapid / fast(er) / quick(er)

allow ecf from antitoxins / antigens / antibiotics
ignore engulfing
ignore reference to specificity

1

[8]

Q33.

(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

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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]

Q34.

(a) hearsay

1

(b) (volunteers with feet in) <u>empty</u> bowls

accept bowl with no (iced) water

*do **not** accept mention of bowl with iced water*

1

(c) any **three** from:

ignore control variables, eg age, gender

- only some of those whose feet were in cold water caught colds
- some controls caught colds
- only feet were cold in experimental group

  allow (control) not wrapped up warm
- only kept feet in cold water for 20 minutes
- insufficient evidence for 'proof' / only showed increased risk

  allow small sample size
- don't know activities of individuals before / after the investigation (eg exposure to cold virus) / reference to immune system

  allow investigation done in 'cold season'

3

[5]

Q35.

(a) (i) kills / gets rid of / reduces <u>methane</u> bacteria

allow kills / gets rid of / reduces <u>bad</u> bacteria

ignore acts like antibiotic

1

(ii) less food converted to methane

allow can keep more cattle without further environmental damage

ignore energy

1

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more growth / meat / muscle / milk produced / more profit / fatter animals

ignore references to bacteria and disease

1

(b) absorbs energy / heat radiated by Earth

allow absorbs / traps energy / heat / from Earth

*do **not** allow absorbs energy / heat from Sun*

1

some energy / heat reradiated

ignore reflected

*do **not** allow reradiates energy / heat from Sun*

1

leading to global warming / enhanced greenhouse effect

accept effects of global warming eg melting ice caps

accept methane is a greenhouse gas

ignore references to ozone

1

[6]

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