

Infection and response practice questions

28 questions • 83 marks • mark scheme at the back

For AQA GCSE Biology 8461 and Combined Science: Trilogy 8464. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 83

Communicable diseases Spec 4.3.1

1 Which of these lists contains only types of pathogen? [1 mark]

- A . ☐ Viruses, bacteria, protists and fungi
- B . ☐ Viruses, bacteria, enzymes and fungi
- C . ☐ Bacteria, protists, antibodies and fungi
- D . ☐ Viruses, protists, antitoxins and bacteria

2 Describe three ways in which pathogens can be spread. [3 marks]

3 State two symptoms of measles and describe how the measles virus is spread. [3 marks]

4 HIV can lead to AIDS. (a) Describe how HIV is spread. (2) (b) Explain how HIV infection can lead to AIDS. (2) [4 marks]

5 Tomato plants infected with tobacco mosaic virus (TMV) have leaves with a mosaic pattern and the plants grow slowly. Explain why the plants grow slowly. **[2 marks]**

6 *Salmonella* food poisoning is caused by bacteria. (a) Describe how people become infected with *Salmonella*. (1) (b) State two symptoms. (2) **[3 marks]**

7 Gonorrhoea is a sexually transmitted disease. (a) Describe two symptoms of gonorrhoea. (2) (b) Give one way the spread of gonorrhoea can be controlled. (1) **[3 marks]**

8 Rose black spot is a fungal disease. (a) Describe the symptoms of rose black spot. (1) (b) Describe two ways of treating rose black spot. (2) **[3 marks]**

9 Malaria is caused by a protist. (a) Explain how malaria is spread from one person to another. (2) (b) Describe two ways the spread of malaria can be controlled. (2) **[4 marks]**

10 Which of these is one of the body's non-specific defences against pathogens? **[1 mark]**

- A. ☐ Antibody production
- B. ☐ Antitoxin production
- C. ☐ Acid in the stomach
- D. ☐ Vaccination

11 Describe how the skin, the nose, the trachea and bronchi and the stomach each help to defend the body against pathogens. **[4 marks]**

12 Describe three ways in which white blood cells help to defend the body against pathogens. **[3 marks]**

13 Explain how vaccination prevents a person from becoming ill with a disease. **[4 marks]**

14 A town has 15 000 people. 12 600 people have been vaccinated against measles. **[2 marks]**
Calculate the percentage of the population that is vaccinated.

Answer =

15 Explain how vaccinating a large proportion of a population can protect people who have not been vaccinated. **[2 marks]**

16 A patient has influenza, which is caused by a virus. The doctor decides not to prescribe an antibiotic. Explain why. **[3 marks]**

17 Name the plant or microorganism that each of these drugs originates from. (a) digitalis (1) (b) aspirin (1) (c) penicillin (1) **[3 marks]**

18 A new drug has been developed. Describe how preclinical testing and clinical trials are used to test the drug. **[4 marks]**

22 Triple only Higher tier [4 marks]

Monoclonal antibodies can be used to treat cancer. Explain how a monoclonal antibody can deliver a drug to cancer cells without harming other cells in the body.

23 Triple only Higher tier [2 marks]

Give two uses of monoclonal antibodies other than treating disease.

24 Triple only Higher tier [2 marks]

Give one advantage and one disadvantage of using monoclonal antibodies to treat disease.

Plant disease Spec 4.3.3 Triple only

25 Triple only Higher tier [3 marks]

A gardener notices spots on the leaves of a plant and some stunted growth. (a) State one other sign that a plant may have a disease. (1) (b) Describe two ways the gardener could identify the disease. (2)

26 Triple only [2 marks]

A farmer finds that a crop shows stunted growth. A soil test shows a lack of nitrate ions. Explain why a lack of nitrate ions causes stunted growth.

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

A A (1)

2. [3]

- by direct contact (1) allow example, e.g. sexual contact / exchange of body fluids
- by water (1)
- by air (1) allow droplets from coughs and sneezes

3. [3]

- fever (1)
- red skin rash (1)
- inhalation of droplets from sneezes and coughs (1) allow breathing in droplets

4. [4]

- sexual contact (1)
- exchange of body fluids / blood (1) allow sharing needles by drug users
- HIV attacks the body's immune cells (1) allow white blood cells
- (late stage infection / AIDS) immune system so badly damaged that it cannot deal with other infections or cancers (1)
- do not accept 'HIV is cured / killed by antiretroviral drugs'

5. [2]

- leaves discoloured / mosaic pattern so less photosynthesis (1)
- less glucose / food made for growth (1)
- ignore 'less chlorophyll' unless linked to photosynthesis

6. [3]

- (a) bacteria ingested in food / food prepared in unhygienic conditions (1)
- (b) fever (1)
- (b) abdominal cramps (1)
- (b) vomiting (1)
- (b) diarrhoea (1)
- Max 3 (max 2 for (b))

7. [3]

- thick yellow or green discharge (from vagina or penis) (1)
- pain on urinating (1)
- treatment with antibiotics / using a barrier method of contraception, e.g. condom (1)

8. [3]

- purple or black spots on leaves (1) allow leaves turn yellow and drop early
- using fungicides (1)
- removing and destroying affected leaves (1)

9. [4]

- mosquito is the vector / carries the pathogen (1)
- mosquito picks up the protist from an infected person and passes it on when it bites another person (1)
- preventing the mosquitos from breeding (1)
- using mosquito nets to avoid being bitten (1)

10. [1]

C C (1) (stomach acid kills pathogens; A and B are white blood cell responses to a particular pathogen or toxin; D is a medical intervention, not a natural body defence)

11. [4]

- skin acts as a barrier (to pathogens) (1) allow secretes substances that kill pathogens
- nose: hairs / mucus trap pathogens (1)
- trachea and bronchi: mucus traps pathogens (and cilia move it away) (1)
- stomach: (hydrochloric) acid kills pathogens (1)

12. [3]

- phagocytosis / engulf and digest pathogens (1)
- antibody production (1) allow antibodies destroy / target specific pathogens
- antitoxin production (1) allow antitoxins neutralise toxins
- do not accept 'kill pathogens' without a method

13. [4]

- vaccine contains dead / inactive form of the pathogen (1)
- stimulates white blood cells to produce antibodies (1)
- if same pathogen re-enters the body, white blood cells respond quickly (1)
- produce the correct antibodies (1) so infection prevented / pathogen destroyed
- do not accept 'vaccine contains antibodies' or 'live pathogen'

14. [2]

- $12\,600 \div 15\,000 \times 100$ (1)
- = 84% (1) correct answer with or without working gets 2 marks

15. [2]

- most people are immune so the pathogen cannot spread easily (1)
- unvaccinated people are less likely to come into contact with someone who is infected (1)

16. [3]

- antibiotics cannot kill viruses / viral pathogens (1) allow antibiotics only kill bacteria
- so the antibiotic would not cure the disease (1)
- viruses live and reproduce inside cells (1)
- difficult to kill viruses without damaging the body's tissues (1)
- Max 3

17. [3]

- foxgloves (1)
- willow (1)
- Penicillium mould (1) allow Penicillium

18. [4]

- preclinical testing is done in a laboratory (1)
- using cells, tissues and live animals (1)
- clinical trials use healthy volunteers and patients (1)
- very low doses given at the start (1)
- if safe, further trials to find the optimum dose (1)
- Max 4

19. [6]

Level 3 5-6	A clear, detailed and logical description that covers where drugs come from, preclinical testing, clinical trials including dose and placebo, and peer review. Correct scientific terms are used.
Level 2 3-4	A description that covers most stages in a sensible order but with some gaps or a lack of detail about what each stage tests.
Level 1 1-2	A few simple, separate points about testing a drug, with little detail or order.

Indicative content

- drugs may be extracted from plants or microorganisms or synthesised by chemists in the pharmaceutical industry
- new drugs must be tested to check they are safe and effective
- tested for toxicity, efficacy and dose
- preclinical testing in a laboratory using cells, tissues and live animals
- clinical trials use healthy volunteers and patients
- very low doses given first; if safe, further trials to find the optimum dose
- double blind trials: some patients given a placebo
- results published only after peer review

20. [1] Triple only Higher tier

A A (1)

21. [4] Triple only Higher tier

- mouse lymphocytes are stimulated to make a particular antibody (1)
- lymphocytes combined with a tumour cell (1) to make a hybridoma cell (1)
- hybridoma cell can both divide and make the antibody (1)
- single hybridoma cells are cloned (1) to produce many identical cells making the same antibody
- the antibody is collected and purified (1)
- Max 4

22. [4] Triple only Higher tier

- antibody is specific to / binds to an antigen on the cancer cells (1)
- the antibody is bound to a radioactive substance / toxic drug / chemical that stops cells growing and dividing (1)
- so the substance is delivered to the cancer cells (1)
- the antibody does not bind to other cells so they are not harmed (1)

23. [2] Triple only Higher tier

- diagnosis, e.g. pregnancy tests (1)
- in laboratories to measure levels of hormones / chemicals in blood or detect pathogens (1)
- in research to locate / identify specific molecules in a cell or tissue using a fluorescent dye (1)
- Max 2

24. [2] Triple only Higher tier

- advantage: target specific cells / chemicals so other cells are not harmed (1)
- disadvantage: create more side effects than expected / not yet as widely used as hoped (1)

25. [3] Triple only Higher tier

- any one from: areas of decay (rot) / growths / malformed stems or leaves / discolouration / presence of pests (1)
- reference to a gardening manual or website (1)
- taking the plant to a laboratory to identify the pathogen (1)
- using a testing kit containing monoclonal antibodies (1)
- Max 3 (award (b) for any two)

26. [2] Triple only

- nitrate ions are needed for protein synthesis (1)
- less protein made, so less growth (1) allow fewer new cells made

27. [1] Triple only

B B (1) (chlorosis is caused by magnesium deficiency)

28. [6] Triple only

Level 3 5-6	A clear, detailed description of physical, chemical and mechanical defences, with correct examples of each and the purpose of each stated (resisting invasion by microorganisms or deterring animals).
Level 2 3-4	A description of at least two types of defence with some correct examples, but limited detail about their purpose.
Level 1 1-2	One or two simple examples of plant defences with little or no explanation.

Indicative content

- physical: cellulose cell walls, tough waxy cuticle on leaves, layers of dead cells around stems (bark) which fall off
- these resist invasion of microorganisms
- chemical: antibacterial chemicals; poisons to deter herbivores
- mechanical: thorns and hairs deter animals
- leaves that droop or curl when touched
- mimicry to trick animals