

Antibiotics, culturing microorganisms and new medicines: practice questions

7 questions • 20 marks • mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 20

1 Why can antibiotics not be used to treat a viral disease? [1 mark]

- A. ☐ Viruses are too large to be affected
- B. ☐ Viruses reproduce too quickly for antibiotics to act
- C. ☐ Viruses live inside host cells and do not have the bacterial cell processes that antibiotics inhibit
- D. ☐ Viruses have a cell wall that antibiotics cannot pass through

2 **Triple only** [3 marks]

A student transfers bacteria to an agar plate. Describe three aseptic techniques the student should use.

3 **Triple only** [3 marks]

A student investigated the effect of three antiseptics on bacteria. Paper discs soaked in each antiseptic were placed on a plate of agar covered in bacteria. A fourth disc was soaked in sterile water. The plate was incubated. (a) Suggest why the disc soaked in sterile water was used. (1) (b) Give two variables that should be controlled. (2)

4

Triple only

[3 marks]

A clear zone around an antibiotic disc has a diameter of 18 mm. Calculate the area of the clear zone. Use $\pi = 3.14$. Give the unit.

Answer =

5

Describe the stages in the development of a new antibiotic, in the correct order.

[3 marks]

6

Triple only

Higher tier

[3 marks]

Describe how hybridoma cells are made and why they are used to produce monoclonal antibodies.

7

Triple only

Higher tier

[4 marks]

Monoclonal antibodies can be used to treat cancer. (a) Explain how a monoclonal antibody can be used to treat cancer. (2) (b) Give one advantage of this treatment compared with radiotherapy. (1) (c) Give one other use of monoclonal antibodies. (1)

Mark scheme

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

1. [1]

C C (1)

2. [3] Triple only

- sterilise the inoculating loop in a flame before use (1)
- use agar and petri dishes sterilised in an autoclave (1)
- keep the lid on the petri dish / only lift it briefly (1)
- tape the lid on after inoculating / wash hands / disinfect the bench (1)
- Max 3

3. [3] Triple only

- (a) to show that the water or the paper disc alone does not affect bacterial growth / so any clear zone is caused by the antiseptic (1) ignore 'fair test' unqualified
- (b) same type / volume of bacteria (1)
- same size of disc / same volume of antiseptic / same temperature / same incubation time / same agar (1)

4. [3] Triple only

- radius = $18 \div 2 = 9$ mm (1)
- area = $\pi r^2 = 3.14 \times 9^2$ / 3.14×81 (1)
- 254 mm^2 (1) allow 254.3 or 254.34 mm^2 ; unit required for this mark
- if the diameter is used instead of the radius ($3.14 \times 18^2 = 1017 \text{ mm}^2$), award 1 mark

5. [3]

- discovery of the chemical (1)
- development (1)
- preclinical testing, on cells, tissues and live animals (1)
- clinical testing on people (1)
- Max 3

6. [3] Triple only Higher tier

- a lymphocyte that makes the desired antibody (1) allow the lymphocyte cannot divide
- is fused with a tumour cell (1)
- to make a hybridoma cell, which can divide (1)
- the hybridoma cells produce the antibody as they divide, so large numbers of identical antibodies are made (1)
- Max 3

7. [4] Triple only Higher tier

- (a) a drug is attached to the monoclonal antibody (1)
- the antibody binds to an antigen on the cancer cells so the drug is delivered to them (1)
- (b) targets specific cells / fewer healthy cells are damaged / fewer side effects (1)
- (c) pregnancy testing or locating blood clots or locating cancer cells (1)