

AQA, OCR, Edexcel

GCSE Science

GCSE Biology

Microorganism Answers

Name:

M M E

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Total Marks: /16

Q1: List 2 ways the human body can prevent bacteria entering the body to cause infection.

A= Marks to be awarded for any 2 of the following

- Stomach acid
- Skin
- Nasal Hair
- Bronchial mucus
- Cilia wafting in the bronchi

(2 marks)

Q2: In order to replicate, bacteria use what method of cell division?

A= Binary Fission

(1 mark)

Q3: *Staphylococcus aureus* reproduces every 20 minutes. If there were 300 bacterial cells replicating in nutrient broth, how many cells would there be in the broth after 24 hours? Show your working.

A= 1 mark to be awarded for showing working

1 mark to be awarded for the correct answer

$$24 \times 60 = 1440 \text{ minutes in 24 hours}$$

$$1440 \div 20 = 72 \text{ replications in 24 hours}$$

$$300 \times 2^{72} = 1.45 \times 10^{24}$$

$$\text{Number of bacterial cells after 24 hours} = \underline{1.45 \times 10^{24}}$$

(2 marks)

Q4: Describe how a laboratory technician would use aseptic techniques to prepare a bacterial culture.

A= 1 mark to be awarded for each point (max 4):

- Sterilize equipment
- Sterilize broth/agar
- Work close to a Bunsen burner
- Store petri dish upside down
- Incubate at 25°C

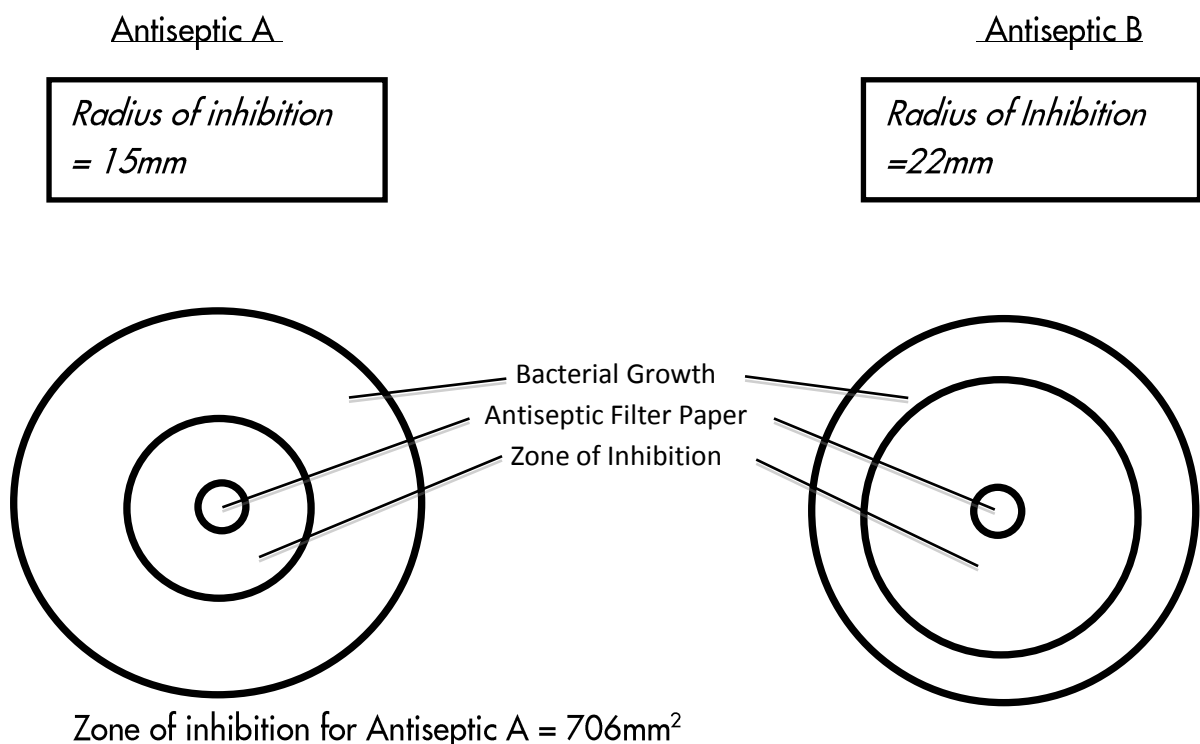
NB: The use of autoclave may be substituted for sterilize

(4 marks)

Q5: *Streptococcus pneumoniae* is a common cause of pneumonia, an infection that affects the lungs. Scientists have developed two antiseptics to help stop the spread of the disease.

By using agar plates and small filter papers containing the antiseptics, the *Streptococcus pneumoniae* is spread across the agar plates to grow. After 48 hours incubation the scientists need to gather the results, to determine which antiseptic is most suitable.

Figure 1:



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- i) Using the information above calculate the zone of inhibition for antiseptic B.

A= 1 mark for showing working

1 mark for use of correct formula (πr^2)

1 mark for the correct answer

$$\text{Radius } 22\text{mm} \times \text{Radius } 22\text{mm} = 484$$

$$484 \times 3.14 (\text{Pi}) = 1519\text{mm}^2 \text{ (1521mm}^2 \text{ if } \pi \text{ is used fully on calc.)}$$

$$\text{Zone of inhibition of antiseptic B} = \underline{1519\text{mm}^2}$$

(3 marks)

- ii) Using your results from figure 1, which antiseptic should the scientists use to help stop the spread of *Streptococcus pneumoniae*?

A= Antiseptic B

(1 mark)

Q6: For future experiments the scientists want to improve the validity of their results. List 3 Variables the scientists can control.

A= Marks awarded for any 3 of the following:

- Same amount of broth/ agar
- Same amount of bacteria
- Incubate for the same length for time
- Incubate at same temperature
- Avoid cross contamination
- Use aseptic techniques

(3 Marks)