Practice Question Set For GCSE
Subject : Biology
Paper-1 Topic: B3 Infection And Response

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Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

This question is about communicable diseases.

Measles is a communicable disease caused by a pathogen.

(a) What type of microorganism causes measles?

_____

(1)

Vaccinations help reduce the spread of measles.

(b) Suggest **two** ways the spread of measles can be reduced.

Do **not** refer to vaccination in your answer.

1 _____

_____

2 _____

_____

(2)

(c) Describe how the measles vaccine helps a person to become immune to the measles pathogen.

_____

_____

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_____

(4)

Norovirus is a type of virus.

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(d) Explain how viruses cause illness.

_____

_____

_____

_____

(2)

(e) Drugs can help to reduce the symptoms of the norovirus infection.

New drugs must go through clinical trials before being licensed for use.

Give **three** reasons why clinical trials are needed.

1 _____

_____

2 _____

_____

3 _____

_____

(3)

(Total 12 marks)

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Q2.

Antibiotics are drugs used to treat bacterial infections.

Mutations in bacteria produce new strains.

Some strains of bacteria are resistant to antibiotics.

(a) Where do mutations happen in a **bacterial** cell?

_____

(1)

A scientist investigated which antibiotics (**A**, **B**, **C**, **D** and **E**) killed *Staphylococcus aureus* (*S. aureus*) bacteria.

This is the method used.

1. Grow *S. aureus* bacteria in a Petri dish.

2. Cut five small discs of paper.

3. Soak each paper disc in a different antibiotic solution.

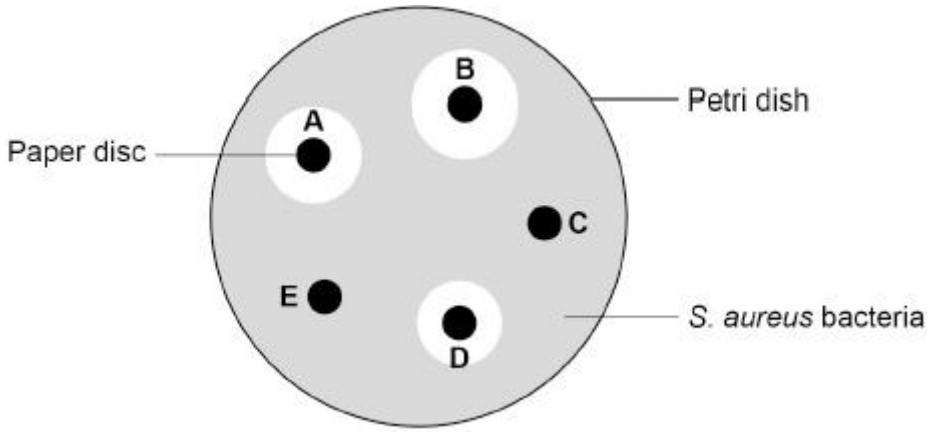
4. Put the five paper discs into the Petri dish.

5. Keep the Petri dish at 37 °C for 24 hours.

Figure 1 shows the results.

A clear area around a disc shows where the bacteria have been killed.

Figure 1



(b) The scientist concluded:

'*S. aureus* is resistant to antibiotics **C** and **E**'.

Explain the evidence for this conclusion.

Use **Figure 1**.

_____

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_____

_____

(2)

(c) The scientist later discovered that *S. aureus* is **not** resistant to antibiotic **E**.

Suggest how the method was developed and showed that *S. aureus* is **not** resistant to antibiotic **E**.

_____

_____

_____

_____

(2)

Broken bones are sometimes repaired using a metal implant.

The area around an implant can become infected with *S. aureus* bacteria. The infection is usually treated with a long-term course of antibiotics.

Long-term use of antibiotics has led to the development of antibiotic resistant bacteria. Research is being carried out into alternative treatments.

Stem cells from bone marrow and from fat tissue have antimicrobial properties.

A scientist investigated the effect of four treatments on the area of infection around metal implants. Each treatment was injected into the area around the implant.

The four treatments were:

- unreactive solution
- antibiotic solution
- stem cells from fat tissue
- stem cells from fat tissue containing antibiotic.

Each treatment was tested on 5 patients where an infection had developed around their metal implant.

After 7 days of treatment, the scientist calculated the ratio:

area of infection **:** total tissue area

(d) What was the independent variable in this investigation?

Tick (✓) **one** box.

The ratio of area of infection **:** total tissue area ☐

The treatment injected around the implant ☐

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The type of antibiotic used ☐

The type of bacterial infection ☐

(1)

(e) Suggest **one** advantage of using stem cells from fat tissue, rather than using stem cells from bone marrow.

_____

_____

(1)

(f) Stem cells containing antibiotic were produced by growing the cells for 24 hours in a solution containing the antibiotic.

How did the antibiotic enter the stem cells from the solution?

Give a reason for your answer.

Tick (✓) **one** box.

By active transport ☐

By diffusion ☐

By osmosis ☐

By translocation ☐

Reason _____

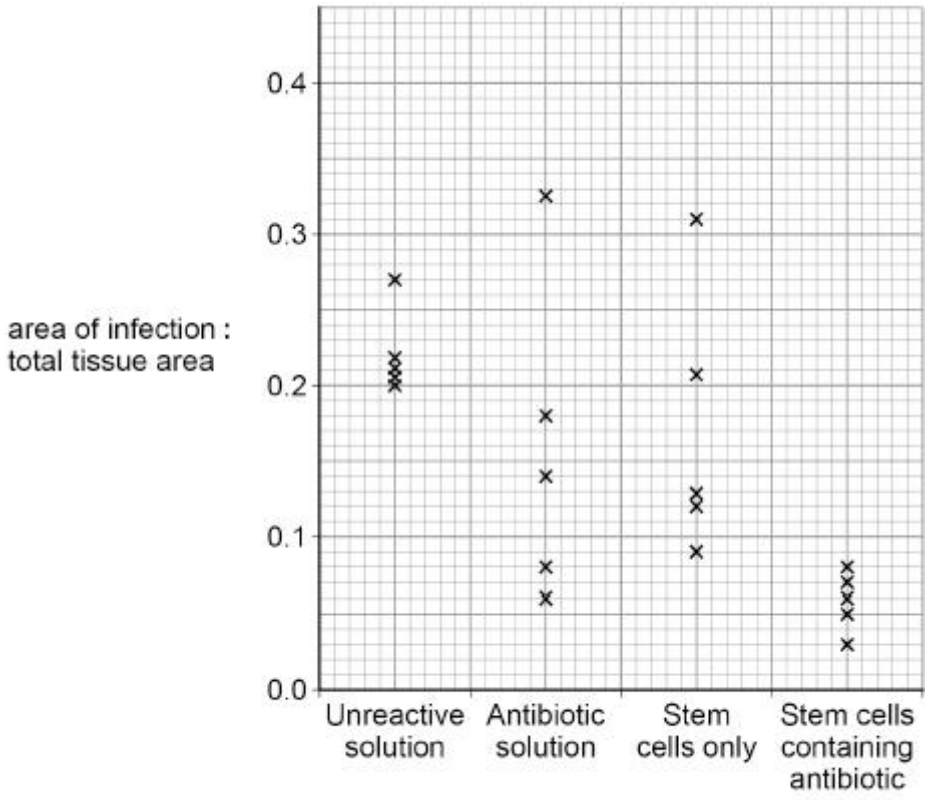
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(2)

Figure 2 shows the results.

Figure 2

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(g) What is the range of results for the treatment with stem cells only?

From _____ to _____

(1)

(h) A student looked at the results and concluded:

'Injections of stem cells containing antibiotic should be used to treat **all** implant-related infections'.

Evaluate the student's conclusion.

Use **Figure 2**.

_____

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(4)
(Total 14 marks)

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