Practice Question Set For GCSE
Subject : Biology
Paper-1 Topic: B1 Cell Biology

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

Q1.

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.

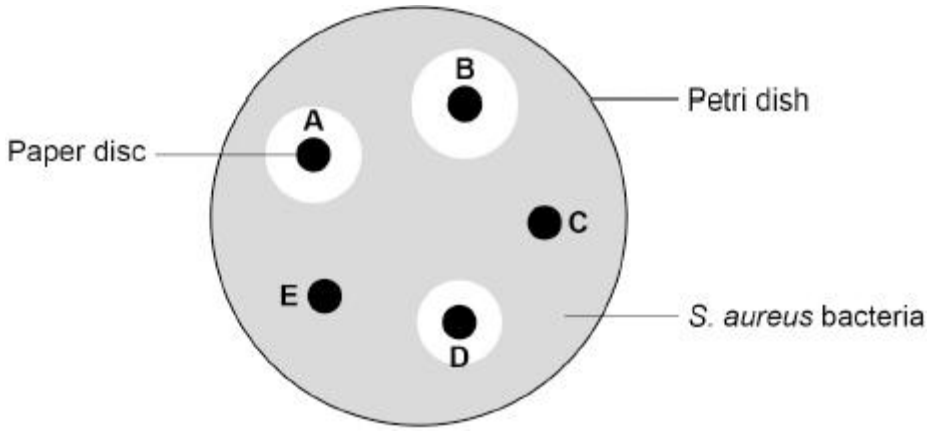
4. Put the five paper discs into the Petri dish.

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



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(b) The scientist concluded:

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

Explain the evidence for this conclusion.

Use **Figure 1**.

_____

_____

_____

_____

(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**.

_____

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(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

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(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 ☐
- 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 _____

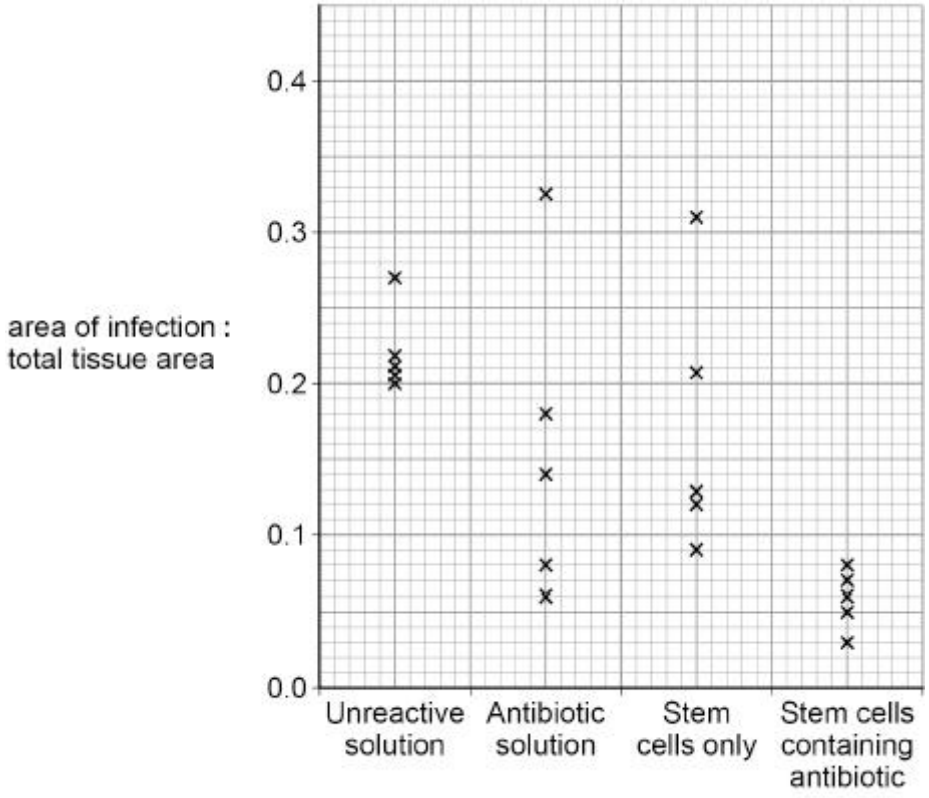
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(2)

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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Q2.

Pathogens are microorganisms that cause diseases.

Gonorrhoea, malaria and measles are three diseases in humans.

(a) Draw **one** line from each disease to the pathogen that causes the disease.

Disease	**Pathogen**
Gonorrhoea	Bacterium
Malaria	Fungus
Measles	Protist
	Virus

(3)

(b) Malaria is transmitted by mosquitos.

Male mosquitos can be sterilised so they are infertile.

The spread of malaria is reduced by releasing sterile mosquitos into the environment.

Explain how releasing sterile mosquitos reduces the spread of malaria.

_____

_____

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_____

_____

(2)

Pathogens also cause diseases in plants.

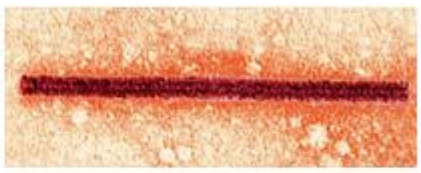
The figure below shows a rose black spot fungal spore and a tobacco mosaic virus.

Rose black spot fungal spore



16 µm

Tobacco mosaic virus



2.5×10^{-7} m

Images are **not** to the same scale

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(c) Name the piece of equipment used to view the virus.

_____

(1)

(d) How many times longer is the fungal spore than the virus?

Use the figure above.

_____

_____

_____

_____

_____

Number of times longer = _____

(3)

(e) Explain why plants infected with tobacco mosaic virus grow slowly.

_____

_____

_____

_____

_____

_____

(3)

(Total 12 marks)

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