OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



EXAM QUESTION PACK

B2.4 HOW CAN WE IDENTIFY THE CAUSE OF AN INFECTION? (FOUNDATION)

SCORE	PERCENTAGE
/13	%

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1. Amir works in a laboratory. His job is to identify the pathogens that cause plant diseases.

Amir has a sample of bacteria from an infected plant.

He wants to test the effectiveness of different antibiotics against the bacteria.

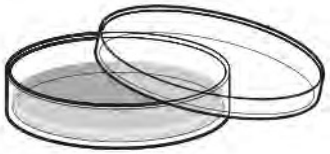
Amir writes a method for transferring bacteria from the sample onto a Petri dish.



glass bottle containing the sample of bacteria



wire loop



Petri dish containing agar jelly

Method:

1. Pick up the wire loop from the bench.
2. Open the glass bottle containing the sample of bacteria.
3. Dip the loop in the sample of bacteria
4. Take the lid off the Petri dish.
5. Wipe the loop over the agar jelly in the Petri dish to spread bacteria.
6. Put the lid back on the Petri dish.

(i) Suggest **three** improvements Amir could make to his method to reduce the risk of contaminating the Petri dish with unwanted bacteria.

1 ----------

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2 ----------

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3 _____

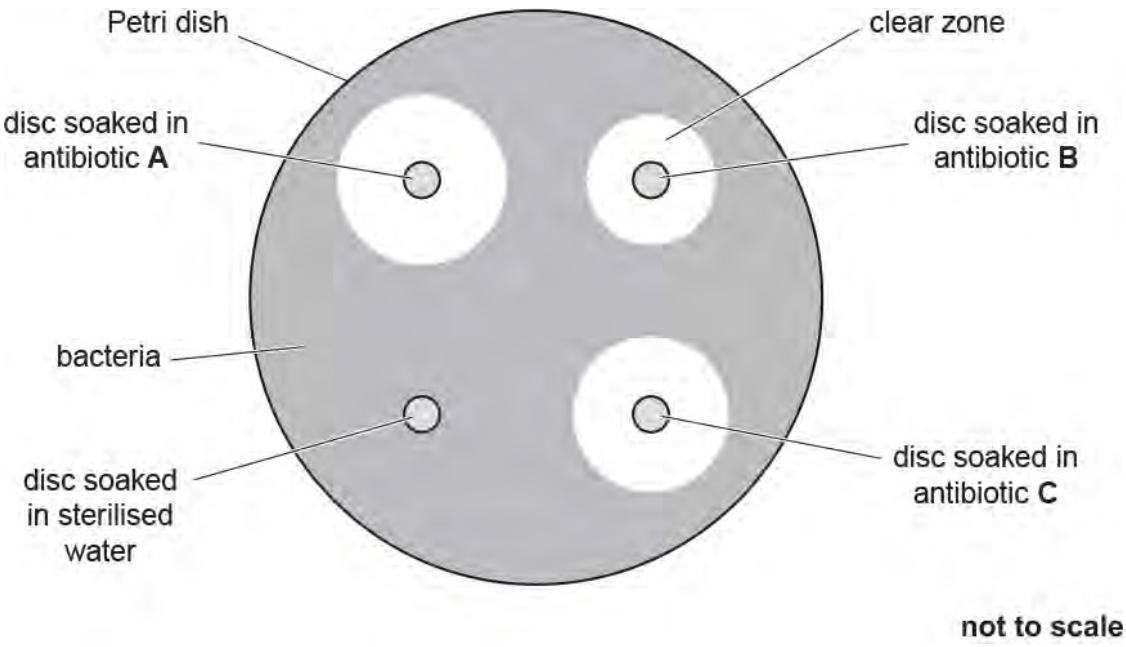
_____ [3]

(ii) After transferring bacteria from the sample onto a Petri dish, Amir adds four different paper discs to the agar.

Three of the discs have been soaked in solutions of different antibiotics, **A**, **B** and **C**. One disc has been soaked in sterilised water.

Amir places the dish in an incubator overnight. The bacteria grow to cover the surface of the agar jelly.

The diagram shows what he sees after the dish has been incubated.



The radius (r) of the clear zone around the disc soaked in antibiotic **A** is 11 mm.

Calculate the area of this clear zone.

Use the equation: area of clear zone = $3.14 \times r^2$

Give your answer to **3** significant figures.

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Area of clear zone = _____ mm^2 **[3]**

(iii) Amir sets up three more Petri dishes in the same way as the first.

The table shows his results for all four dishes.

Disc	Soaked in	Area of clear zone (mm^2)			
		Petri dish 1	Petri dish 2	Petri dish 3	Petri dish 4
1	Antibiotic **A**		363	346	346
2	Antibiotic **B**	227	363	227	214
3	Antibiotic **C**	314	283	298	314
4	Sterilised water	0	0	0	0

Amir thinks one of the discs was soaked in the wrong solution.

Suggest which disc may have been soaked in the wrong solution.

Give a reason for your answer.

Disc _____ in Petri dish _____

Reason _____

_____

_____ **[2]**

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2. Jane's dog has arthritis in its hip joint. This makes the joint stiff and painful.

Jane reads an article in a magazine. Here is the article's headline:

Stem cell therapy to help dogs with arthritis

(i) Explain what a stem cell is and why they are used in medicine.

---

[2]

(ii) The article explains that stem cells were removed from a dog's fat tissues and were then grown in a laboratory.

Explain why a vet would have used aseptic techniques when growing the stem cells.

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[1]

(iii) Which of the following are also sources of stem cells?

Tick (✓) **two** boxes.

Bone marrow ☐

Embryos ☐

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Hair ☐

Nerve cells ☐

Red blood cells ☐

[2]

END OF QUESTION PAPER

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