| | |
|---|---|
| **Total marks** | 12 |
| **Time allowed** | Approximately 25 minutes |
| **Instructions** | Answer ALL questions. Write answers in the spaces provided. |

## Question 1

*Three antibiotic discs (X, Y, Z) were placed on agar plates containing bacteria. After 48 hours at 25°C, the zones of inhibition were measured.*

| Antibiotic | Zone diameter — plate 1 (mm) | Plate 2 (mm) | Plate 3 (mm) | Mean zone diameter (mm) |
|---|---|---|---|---|
| X | 24 | 22 | 26 | 24.0 |
| Y | 8 | 10 | 9 | 9.0 |
| Z | 0 | 0 | 0 | 0.0 |

A student grows bacteria on agar plates and places antibiotic discs to investigate which antibiotic is most effective. The table shows the results.

[0 marks]

## Question 2

Using the results, state which antibiotic is most effective against the bacteria. Explain your reasoning.

[2 marks]

## Question 3

Antibiotic Z produced no zone of inhibition. What conclusion can you draw about the bacteria and antibiotic Z?

[2 marks]

## Question 4

The student incubated the plates at 25°C. Explain why 25°C is used rather than 37°C (body temperature) in school experiments.

[2 marks]

## Question 5

Describe THREE techniques the student should use to prevent contamination of the agar plates during the experiment.

[3 marks]

★ **Higher Tier**

## Question 6

A student calculates the area of the zone of inhibition for antibiotic X using the formula $A = \pi \times (d/2)^2$. Calculate the area of the zone for antibiotic X. Give your answer to 3 significant figures.

[3 marks]

**END OF QUESTIONS — Total: 12 marks**