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