2025 Bi H1 Q15

Section: Sustainability and Interdependence

Topic: Crop Protection

Question Summary:

A study measured viable bacterial cell numbers when incubated with 5% and 10% eucalyptus oil. You are asked to calculate the percentage of bacteria killed by 5% eucalyptus oil after 50 minutes, using the graph provided.

Worked Solution:

To calculate the percentage killed:
1. Determine the initial number of viable cells (at time 0).
2. Determine the number of viable cells after 50 minutes.
3. Use: **% killed = ((initial – final) / initial) × 100**

From the graph:
- Initial viable cells at 0 minutes ≈ **40 × 10^9 cells**.
- Viable cells at 50 minutes with 5% oil ≈ **10 × 10^9 cells**.

Apply the formula:
((40 – 10) / 40) × 100 = (30 / 40) × 100 = **75%**

Therefore, 75% of the bacteria were killed after 50 minutes in 5% eucalyptus oil.

Final Answer: D (75%).

Revision Tips:

- When calculating percentage killed, always compare the remaining cells to the initial population.
- Percentage killed = 100% – percentage survival.
- Always read values from graphs by estimating carefully between gridlines.