2024 Ph H1 Q19

Section: Electricity

Topic: Current, PD, Power, Resistance

Question Summary
A 2.2 kΩ resistor is rated at 0.25 W. The potential difference across the resistor when operating at rated power is required.

Worked Solution
Power is related to potential difference by:
$P = V^2 / R$.

Rearranging: $V = \sqrt{(P \times R)}$.
Substitute: P = 0.25 W, R = 2200 Ω.
$V = \sqrt{(0.25 \times 2200)} = \sqrt{550} \approx 23.5$ V.

Final Answer: D

Revision Tips

- Use $P = V^2 / R$ to find voltage when resistance and power are known.
- Check units carefully: 2.2 kΩ = 2200 Ω.
- Always round sensibly to match multiple choice options.