

GCSE Physics A (Gateway)
J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 10

1

Energy is transferred at high voltages in the national grid.

- (a) This house is near to a transmission line.



Explain why radio waves may be produced by the transmission line.

Radio waves can be produced by oscillations in electrical circuits. When conductors absorb radio waves, an alternating current is created. [2]

- (b) Explain why it is more efficient to transfer energy at high voltages.

As when voltage is increased, current decreases, therefore reducing the power loss through the wire. \rightarrow more efficient. (Power loss $= I^2 R$) [2]

- (c) The transmission line has a power loss of 6.156 kW. ($P_{\text{loss}} \propto I^2$)

Its resistance is 15.39 Ω .

Calculate the current in the transmission line.

$$P = I^2 R$$
$$\sqrt{\frac{P}{R}} = I \quad \sqrt{\frac{6.156 \times 10^3}{15.39}}$$

$$= 20 \text{ A}$$

Current = 20 A

[5]

Total Marks for Question Set 10: 9

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