

- 5 (a) Distinguish between the peak value and root-mean-square value of an alternating current.
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[2]

- (b) Express the V_{rms} of the half rectified sinusoidal voltage shown in Fig. 5.1 in terms of V_0 .

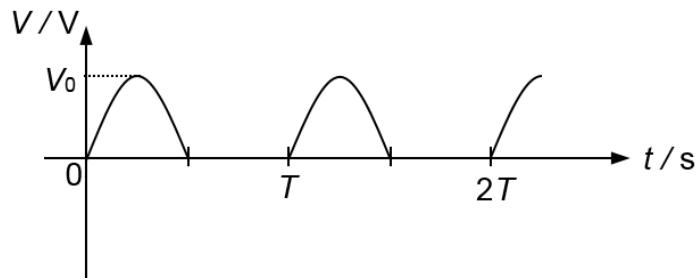


Fig. 5.1

$$V_{\text{rms}} = \dots \text{ V} \quad [2]$$

- (c) A power station needs to deliver 20.0 MW of power to a city 10.0 km away. This power is generated at 16.0 kV and then stepped up to 240 kV using a transformer before transmission. The resistance per unit length of the transmission cables is $20.0 \Omega \text{ km}^{-1}$.

The operator of the station loses \$0.10 for every kWh of electrical power lost.

- (i) Calculate the power lost during transmission.

power lost = W [2]

- (ii) Hence determine the amount of money saved by the station in one day by transmitting power at 240 kV instead of 16.0 kV.

money saved = \$..... [3]

[Total: 9]

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