

## Mark scheme for Extension Worksheet – Topic 5, Worksheet 8

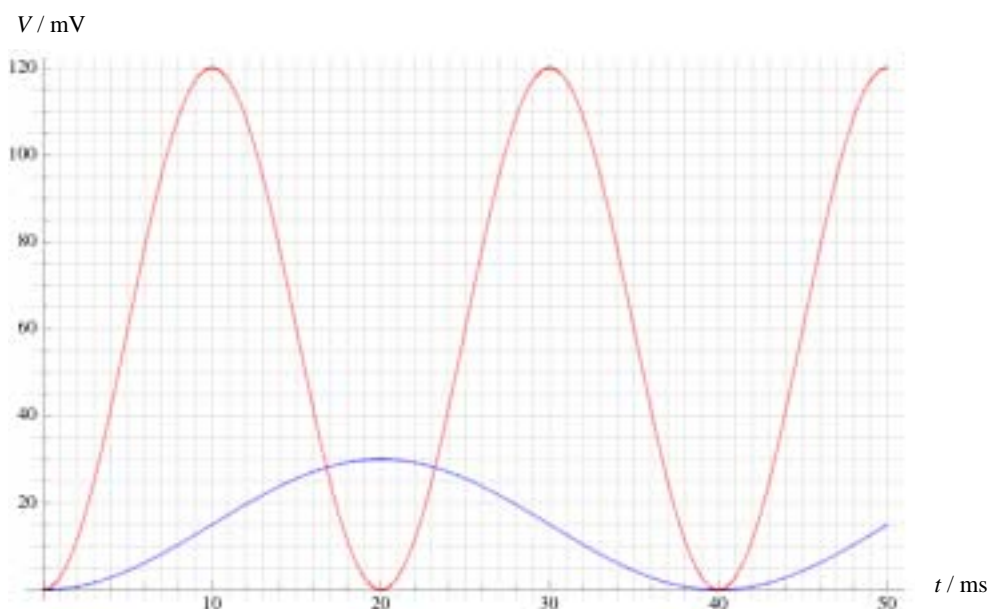
1  $0.60 \times V_P I_P = V_S I_S \Rightarrow I_S = \frac{0.60 \times V_P I_P}{V_S}; I_S = \frac{0.60 \times 2000 \times 4.0}{400} = 12 \text{ A}$  [2]

2 The average power in one of the resistors is  $\frac{V_{\text{rms}}^2}{R} = \frac{V_0^2}{2R}$ ; hence the total average power in the circuit is  $\frac{V_0^2}{R}$ . [2]

3 a The average power is half the peak power i.e. 60 W. [1]

b The period is 40 ms; and hence the frequency is  $\frac{1}{40 \times 10^{-3}} = 25 \text{ Hz}$  [2]

4 See graph in blue. Correct amplitude; correct period.



[2]

5 When the switch is closed a current begins to get established in the coil and so the flux in the coil begins to increase; therefore an emf will be induced in the coil that will oppose the increase in flux and also the emf of the battery; the opposing emf means that the current takes time to reach its maximum flux. [3]

6 The power that is lost is  $RI^2$ . By increasing the voltage by factor of  $\frac{120}{2} = 60$ ; the power lost is decreased by a factor of  $60^2 = 3600$ . [2]