8 Fig. 8.1 shows a simplified circuit diagram of a laptop adaptor connected to the chargeable battery of a laptop. The adapter consists of a step-down transformer with a single diode.

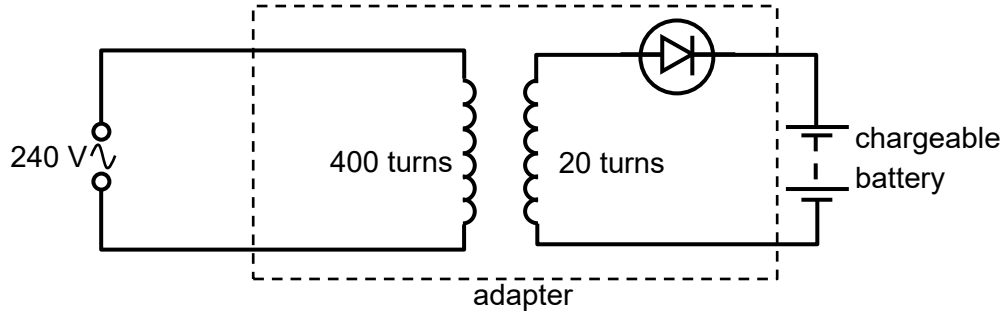


Fig. 8.1

(a) Calculate the peak voltage across the secondary coil and state one assumption made in performing the calculation.

peak voltage = ... V [1]

Assumption:

.....

.....

[1]

(b) Explain why, during the charging process, the power delivered to the secondary coil is twice the power delivered to the chargeable battery.

.....

.....

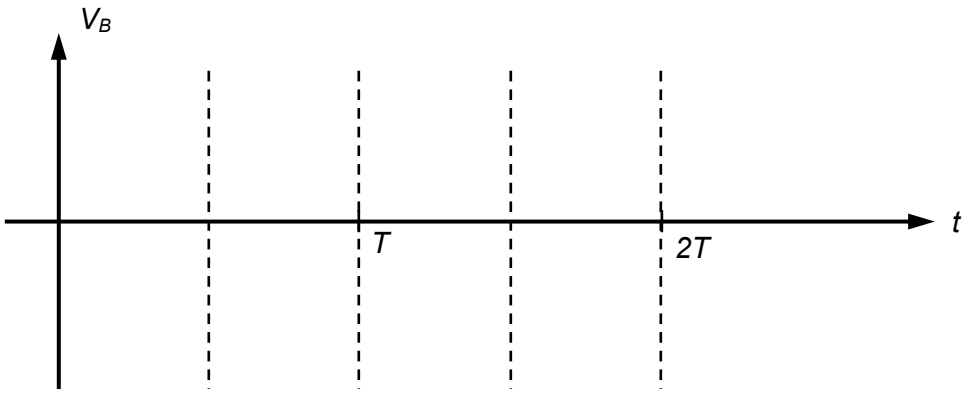
.....

[1]

(c) Hence show that the voltage rating of the chargeable battery is 8.5 V.

[1]

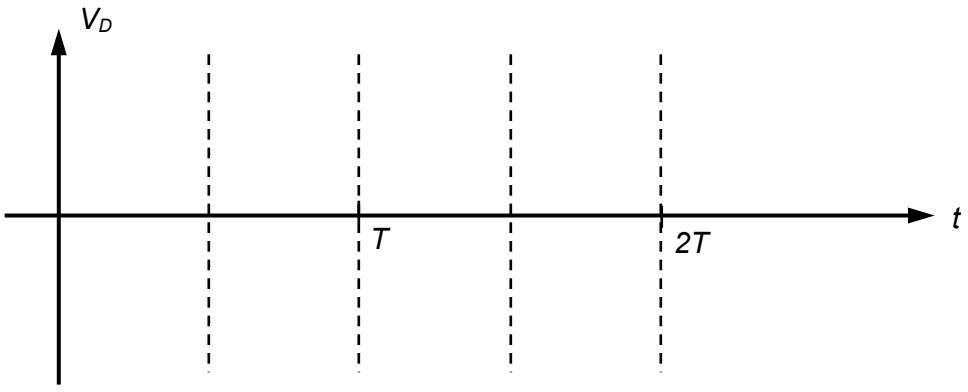
(d) Sketch on Fig. 8.2 the variation of potential difference V_B across the chargeable battery with time t. It is given that T is the period of the alternating current.



[1]

Fig. 8.2

(b) Hence sketch on Fig. 8.3 the variation of the potential difference across the diode V_D with time t. Label appropriate values. It is given that T is the period of the alternating current.



[2]

Fig. 8.3

[Total: 7]