6 **(a)** State Faraday's law of electromagnetic induction.

....

....

.... [2]

(b) The output of an ideal transformer is connected to a bridge rectifier, as shown in Fig. 6.1.

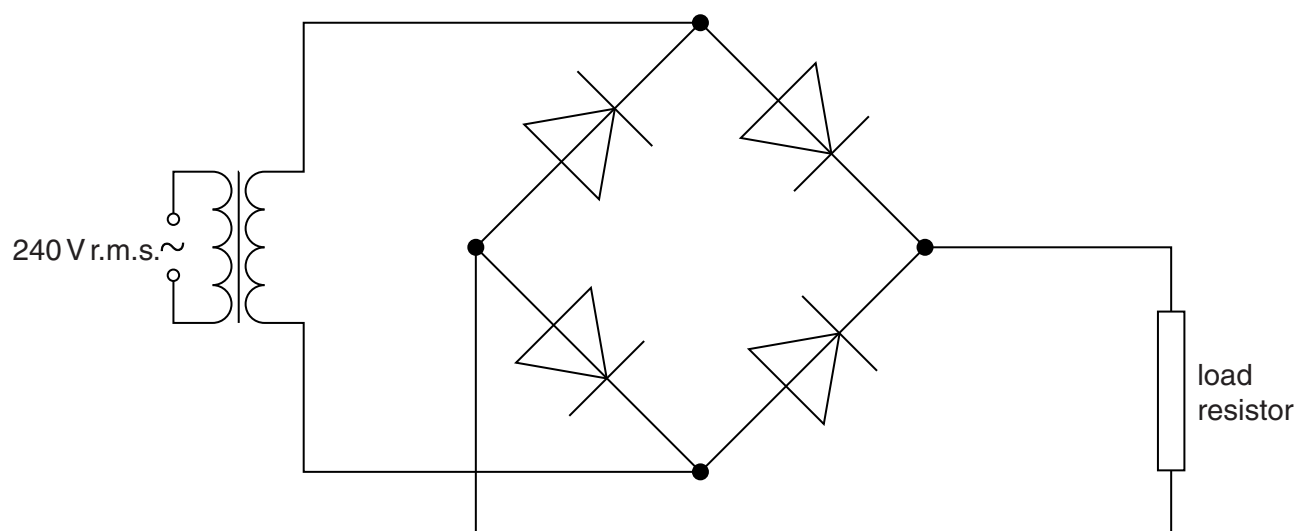240 V r.m.s.

load
resistor

Fig. 6.1

The input to the transformer is 240 V r.m.s. and the **maximum** potential difference across the load resistor is 9.0 V.

(i) On Fig. 6.1, mark with the letter P the positive output from the rectifier. [1]

(ii) Calculate the ratio

$$\frac{\text{number of turns on primary coil}}{\text{number of turns on secondary coil}}.$$

ratio = ... [3]

(c) The variation with time *t* of the potential difference *V* across the load resistor in **(b)** is shown in Fig. 6.2.
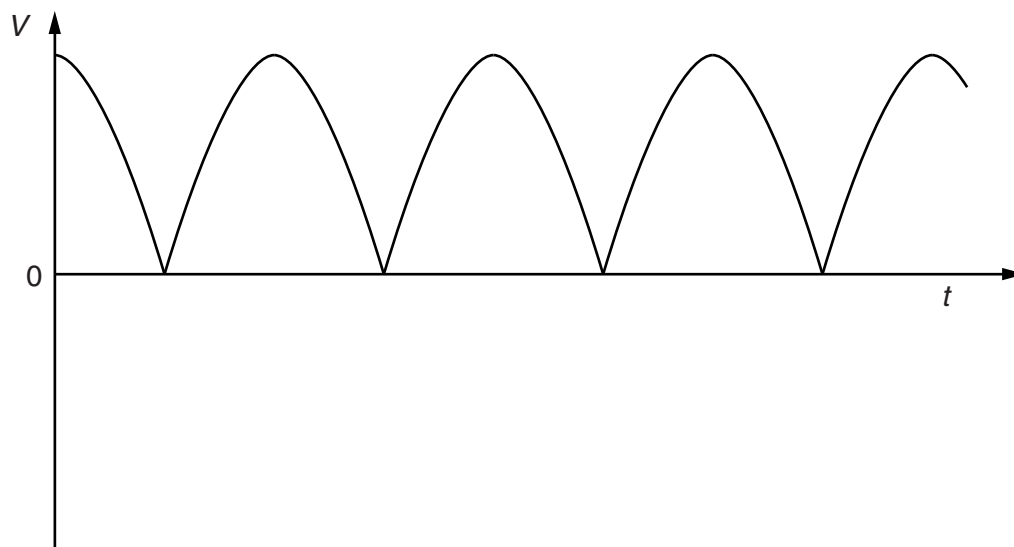
Fig. 6.2

A capacitor is now connected in parallel with the load resistor to produce some smoothing.

(i) Explain what is meant by *smoothing*.

....

.... [1]

(ii) On Fig. 6.2, draw the variation with time *t* of the smoothed output potential difference. [2]