4 An ideal transformer has 5000 turns on its primary coil. It is to be used to convert a mains supply of 230 V r.m.s. to an alternating voltage having a peak value of 9.0 V.

(a) Calculate the number of turns on the secondary coil.

number = ... [3]

(b) The output from the transformer is to be full-wave rectified. Fig. 4.1 shows part of the rectifier circuit.

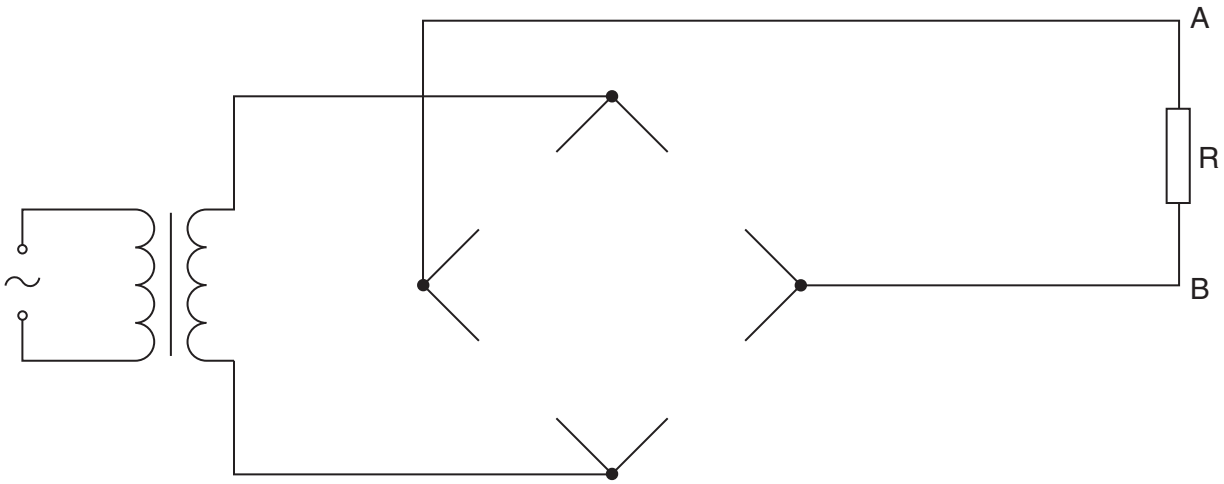

Fig. 4.1

On Fig. 4.1, draw

(i) diode symbols to complete the diagram of the rectifier such that terminal A of the resistor R is positive with respect to terminal B, [2]

(ii) the symbol for a capacitor connected to provide smoothing of the potential difference across the resistor R. [1]

(c) Fig. 4.2 shows the variation with time *t* of the smoothed potential difference *V* across the resistor R.

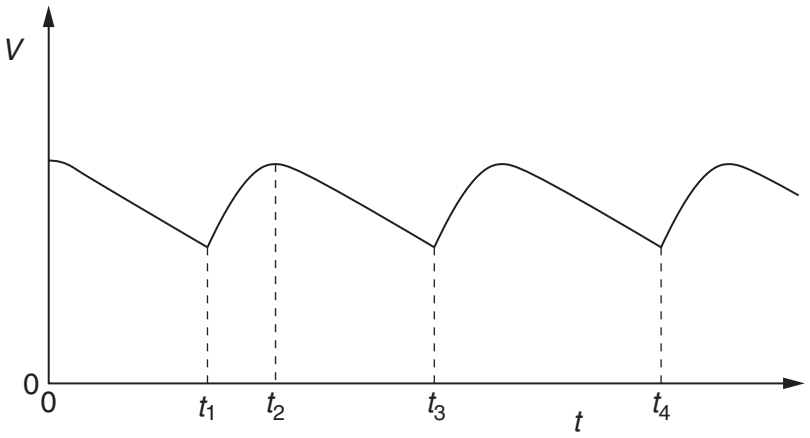

Fig. 4.2

(i) State the interval of time during which the capacitor is being charged from the transformer.

from time …… to time …… [1]

(ii) The resistance of the resistor R is doubled. On Fig. 4.2, sketch the variation with time *t* of the potential difference *V* across the resistor. [2]