6 Fig. 6.1 shows part of a bridge rectifier circuit that can be used for rectification of an alternating input voltage V_{IN}.

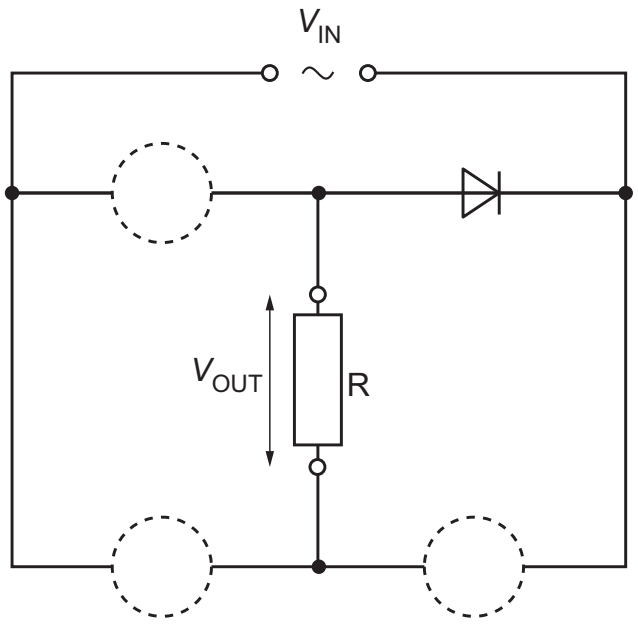

Fig. 6.1

The circuit contains four diodes, one of which is shown.
The rectified output voltage V_{OUT} is applied across load resistor R.

(a) (i) State what is meant by rectification.

.....

..... [1]

(ii) State the name of the type of rectification produced by a bridge rectifier circuit.

..... [1]

(b) The input voltage varies with time t according to the equation

$$V_{IN} = 34 \sin 18t$$

where V_{IN} is in V and t is in s.

(i) Show that the period of the input voltage is 0.35 s.

[2]

(ii) Calculate the root-mean-square (r.m.s.) input voltage.

r.m.s. voltage = ... V [1]

(ii) Calculate the time constant of the smoothing circuit.

time constant = ... s [2]

(iii) During each discharge cycle, the time for which the capacitor is discharging is 0.14 s.

Determine the minimum value of the smoothed output voltage.

minimum voltage = ... V [2]

[Total: 15]