**6** Fig. 6.1 shows a circuit that rectifies an alternating input voltage $V_{IN}$ and produces an output voltage $V_{OUT}$ across a resistor R.

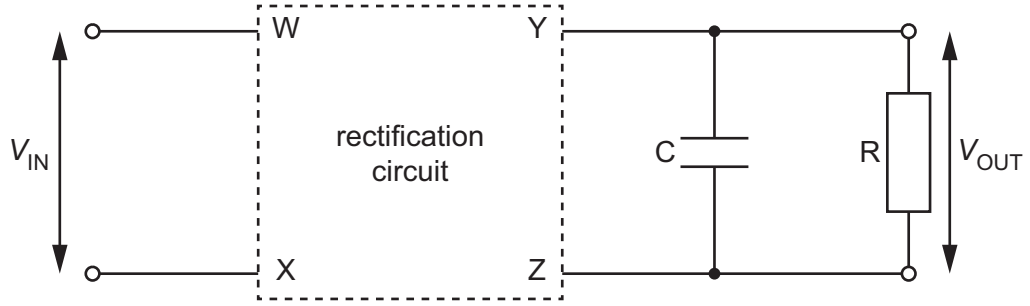


**Fig. 6.1**

The four terminals of the rectification circuit are labelled W, X, Y and Z.
A capacitor C is connected in parallel with resistor R.

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

.....

..... [1]

**(ii)** State the purpose of capacitor C.

.....

..... [1]

**(b)** Fig. 6.2 shows the variations with time $t$ of the potential differences (p.d.s) $V_{IN}$ and $V_{OUT}$.

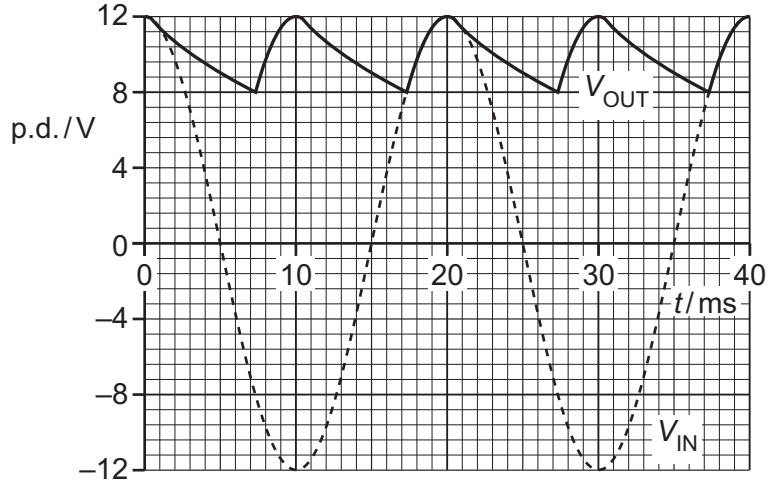


**Fig. 6.2**

**(i)** The variation of $V_{IN}$ with $t$ can be represented by

$$V_{IN} = A \cos Bt$$

where $A$ and $B$ are constants.

Determine the values of $A$ and $B$. Give a unit with your answer for $A$.

$A$ = ..... unit .....

$B$ = ..... rad $s^{-1}$ [2]

**(ii)** Determine the type of rectification produced by the circuit in Fig. 6.1.

..... [1]

**(iii)** On Fig. 6.3, draw the circuit diagram for the components inside the rectification circuit.

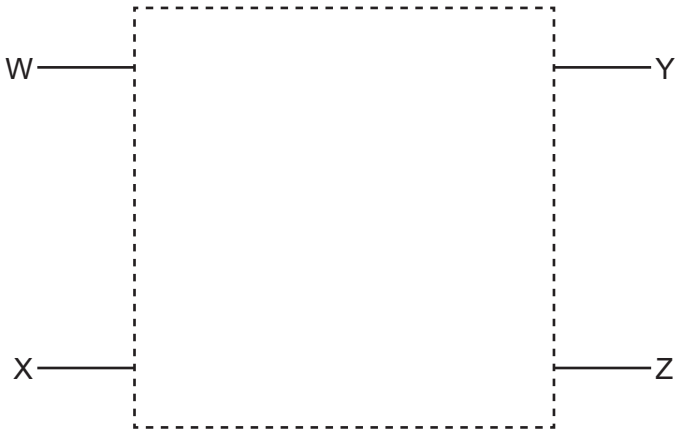


**Fig. 6.3**

[2]

**(iv)** Determine a value for the time constant for the discharge of the capacitor C through the resistor R in Fig. 6.1.

time constant = ..... s [3]

**(c)** The capacitor C has a capacitance of 570 μF.

Use your answer in **(b)(iv)** to determine the resistance of resistor R.

resistance = ..... Ω [2]

[Total: 12]