6 A power supply is connected across a load as shown in Fig. 6.1.

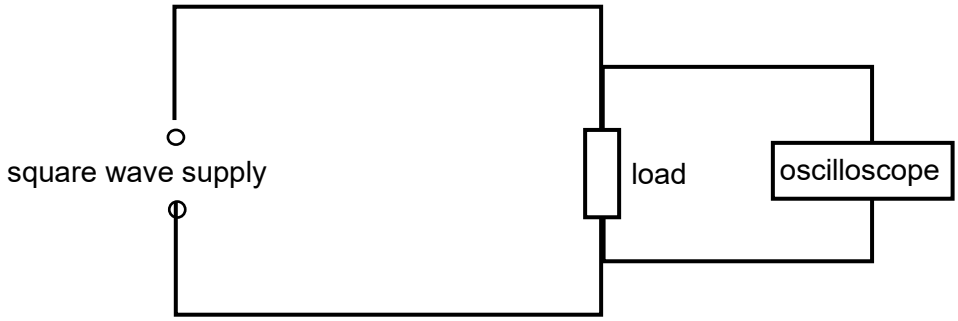


Fig. 6.1

The power supply provides a square wave voltage that cycles between + 7.0 V and – 7.0 V as shown on the oscilloscope display in Fig. 6.2.

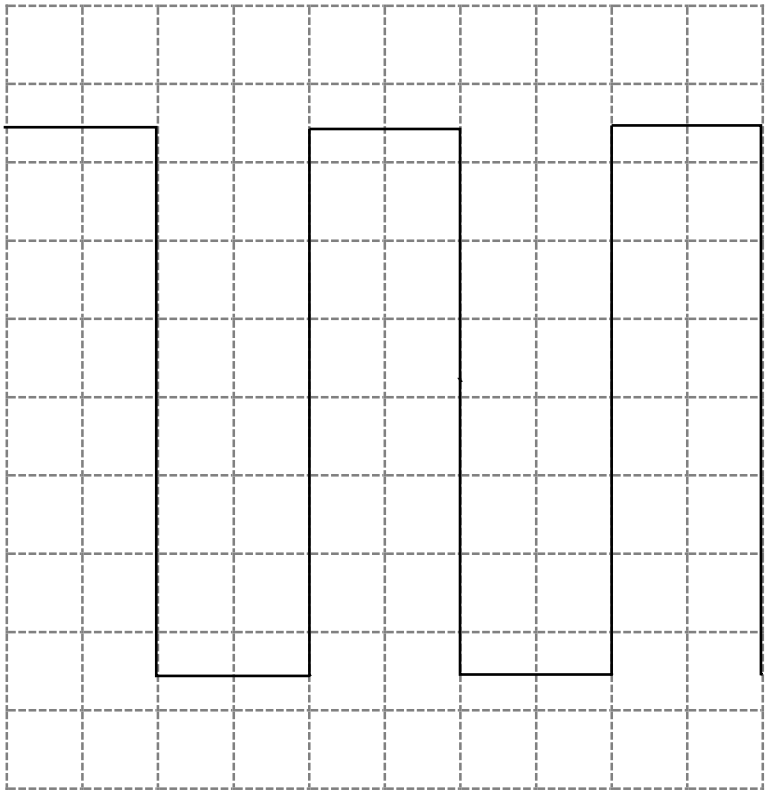


Fig. 6.2

(a) Determine the Y-gain for the oscilloscope based on the waveform shown in Fig. 6.2

Y-gain = ... V / div [2]

(b) Determine the frequency of the square wave given that the time base is 5.0 ms / div.

frequency of square wave = ... Hz [1]

(c) The root-mean-square value for the square wave in Fig. 6.2 is 7.0 V. Explain the significance of this value.

.....

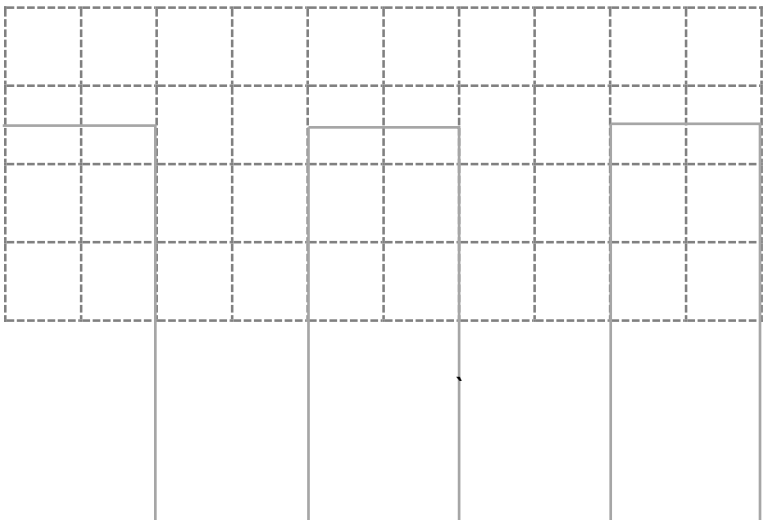
.....

.....

..... [1]

(d) A diode is used to achieve rectification of the square wave.

On Fig. 6.3, sketch the new waveform. The original waveform in Fig. 6.2 has been reproduced as the grey line shown. [1]



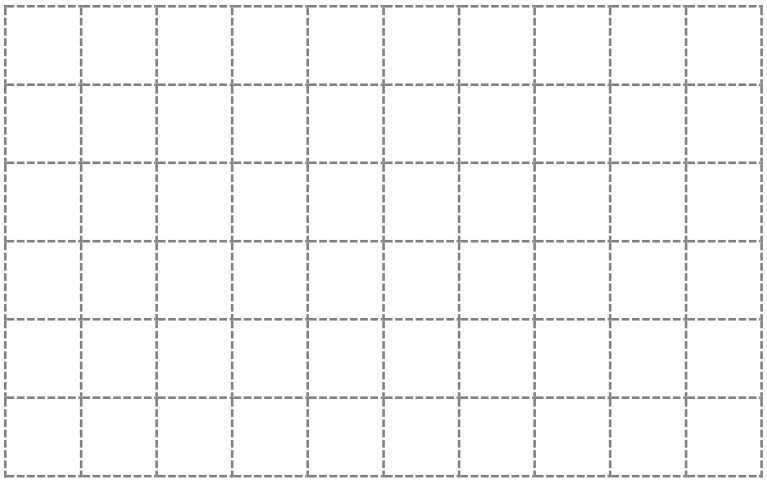


Fig. 6.3

(e) With the diode still in place, the power supply is replaced by another one which is sinusoidal. Determine the value of the peak voltage such that the average power dissipated in the load remains the same as the value given in **(c)**.

peak voltage = ... V [2]

[Total: 7]