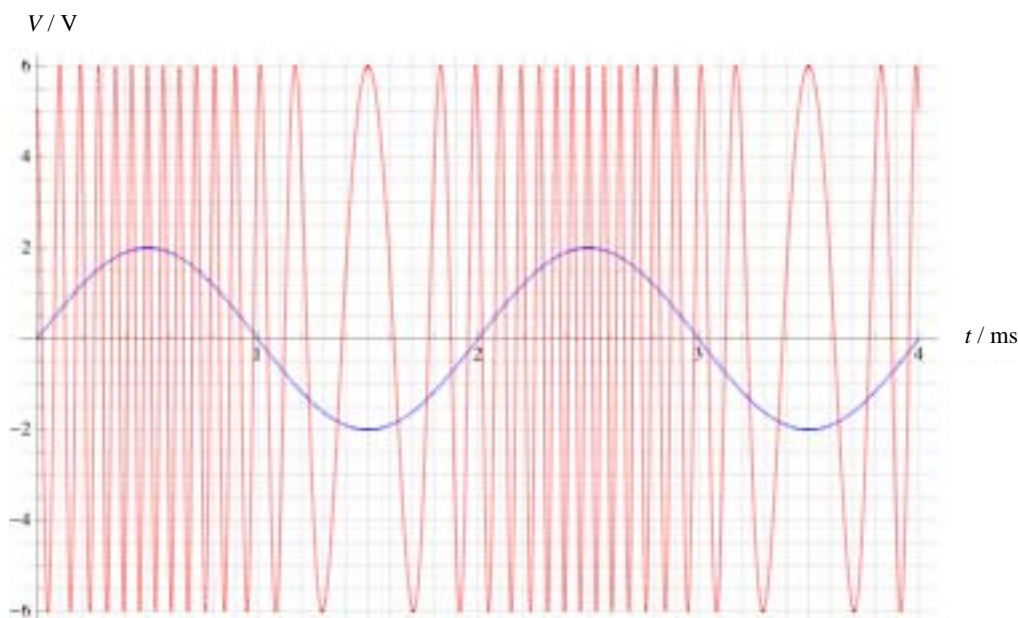


Mark scheme for Extension Worksheet – Option F, Worksheet 1

- 1 a** See graph in blue. Correct amplitude; Correct match with carrier wave.



[2]

- b** The period of the signal wave is $t = 2.0 \text{ ms}$; hence the frequency is

$$f = \frac{1}{2.0 \times 10^{-3}} = 500 \text{ Hz}$$

[2]

- c** The frequency extremes are $f_c \pm kA_s = 8.0 \pm 2.0 \times 0.50$; i.e. from 7.0 kHz to 9.0 kHz.

[2]

2 a $\frac{6.0 - 2.0}{2} = 2.0 \text{ mV}$

[1]

- b** The maximum amplitude of the modulated wave is $A_c + A_s$ and is 6.0 mV; hence the amplitude of the carrier wave is 4.0 mV.

[2]

- c** There are 5 full waves in 1 ms so the period is $\frac{1}{5} = 0.20 \text{ ms}$; and the frequency

$$\text{is } f_c = \frac{1}{0.20 \times 10^{-3}} = 5.0 \text{ kHz}$$

[2]

- d** The time from minimum to minimum amplitude of the modulated wave is 4.0 ms and this is the period of the signal wave; so its frequency is

$$f_s = \frac{1}{4.0 \times 10^{-3}} = 250 \text{ Hz}$$

[2]