4 When a body is subject to a periodic driving force in the presence of damping, it moves in a simple harmonic motion.

(a) Explain what is meant by simple harmonic motion.

……

……

…… [2]

Fig. 4.1 shows the variation with frequency of the amplitude of motion of a body subject to a periodic driving force of various frequency.

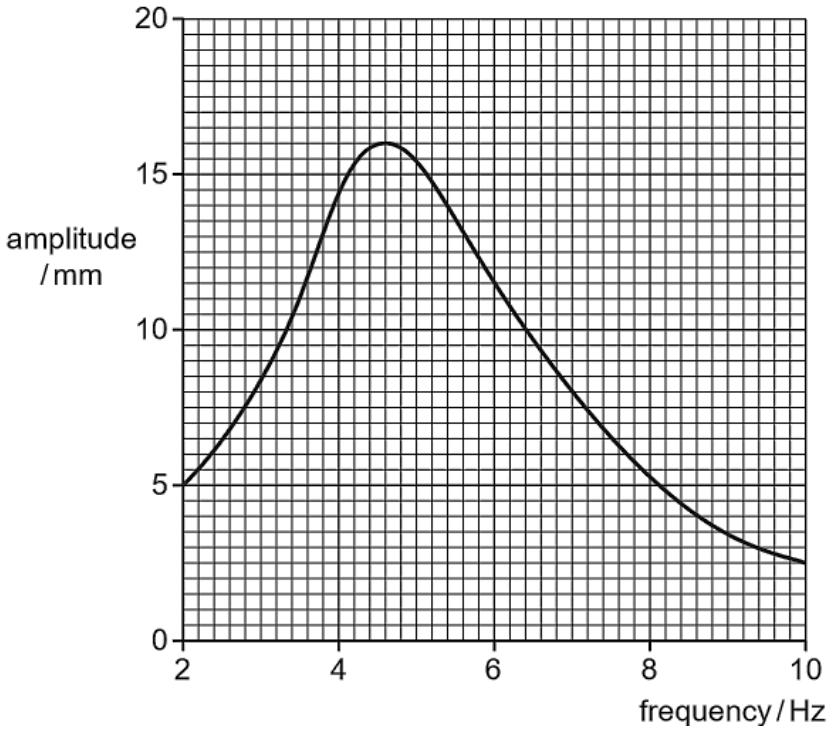

Fig. 4.1

(b) Explain how Fig. 4.1 shows the presence of resonance.

……

…… [1]

(c) State one situation where resonance is useful.

……

……

…… [1]

(d) Calculate the maximum speed of the body when the driving frequency is 10.0 Hz.

maximum speed = …… m s^{-1} [2]

(e) On the axes of Fig. 4.2, sketch a graph to show the variation with time of the displacement of the body over 2 periods when the frequency is 10 Hz. Mark on the axes with the appropriate values.

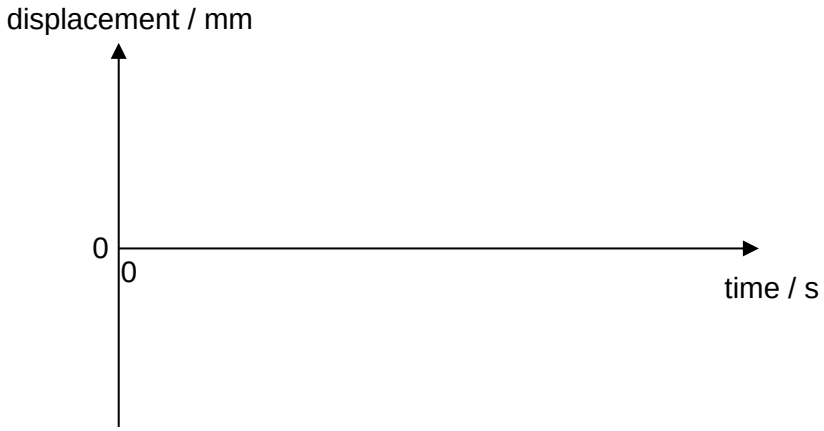

Fig. 4.2

[2]