

- 5 (a) State what is meant by simple harmonic motion.

.....  
.....  
..... [2]

- (b) A block is suspended by a spring. The block oscillates vertically with simple harmonic motion.

The velocity  $v$  of the block varies with time  $t$  according to

$$v = 0.56 \cos 16t$$

where  $v$  is in  $\text{m s}^{-1}$  and  $t$  is in s.

- (i) Calculate the period of the oscillation.

period = ..... s [1]

- (ii) Determine the amplitude  $x_0$  of the oscillation.

$x_0$  = ..... m [2]

- (iii) Use your answer in (b)(ii) to determine the equation for  $v$  in terms of the displacement  $x$  of the block, where  $v$  is in  $\text{m s}^{-1}$  and  $x$  is in m.

$v$  = ..... [1]



(iv) On Fig. 5.1, sketch the variation of  $v$  with  $x$ .

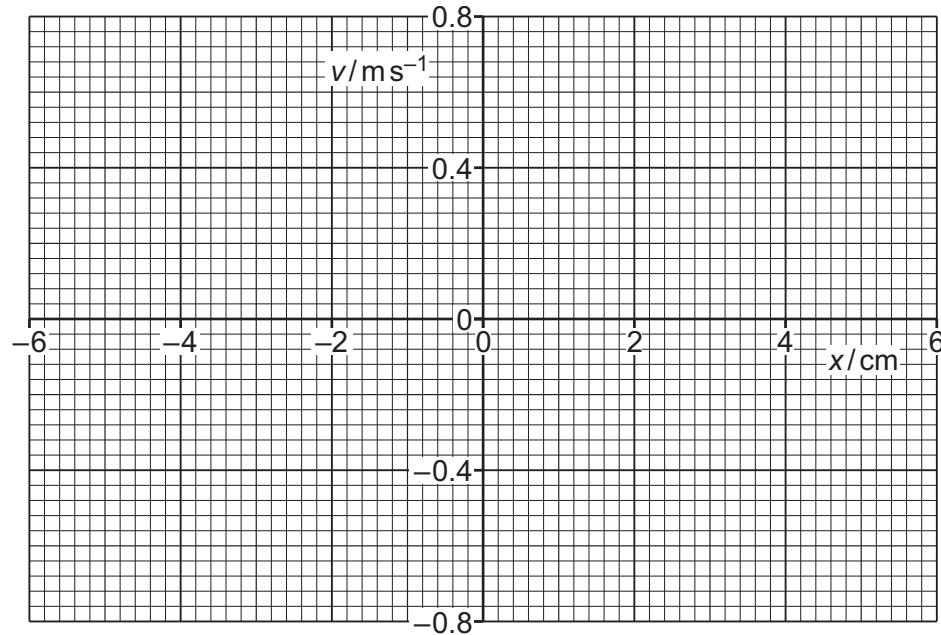


Fig. 5.1

[3]