

- 3 A block is pulled in a straight line along a rough horizontal surface by a varying force  $X$ , as shown in Fig. 3.1.

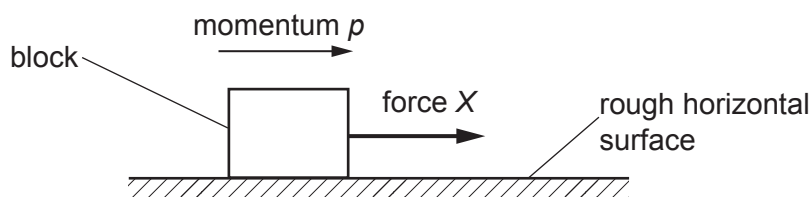


Fig. 3.1

Air resistance is negligible. Assume that the frictional force exerted on the block by the surface is constant and has magnitude  $2.0\text{ N}$ .

The variation with time  $t$  of the momentum  $p$  of the block is shown in Fig. 3.2.

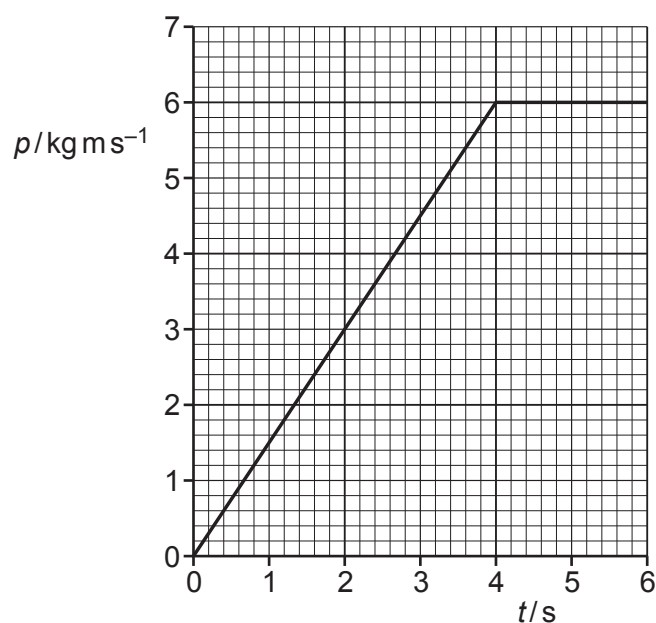


Fig. 3.2

- (a) State Newton's second law of motion.

.....  
..... [1]

(b) Use Fig. 3.2 to determine, for the block at time  $t = 2.0\text{ s}$ , the magnitude of:

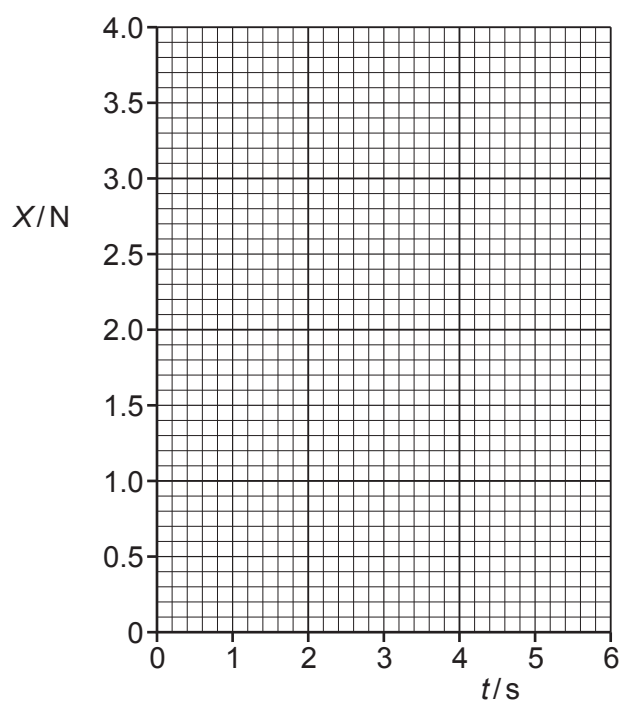
(i) the resultant force on the block

resultant force = ..... N [1]

(ii) the force  $X$ .

$X =$  ..... N [1]

(c) On Fig. 3.3, sketch a graph to show the variation of force  $X$  with time  $t$  from  $t = 0$  to  $t = 6.0\text{ s}$ .



**Fig. 3.3**

[3]

[Total: 6]