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.

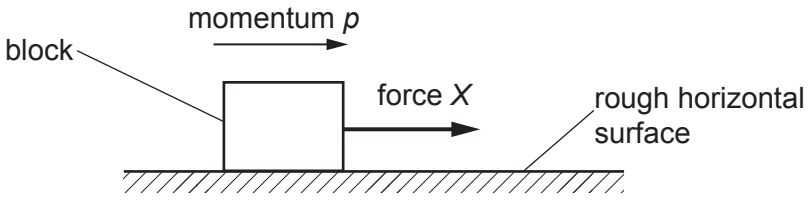

Fig. 3.1

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

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

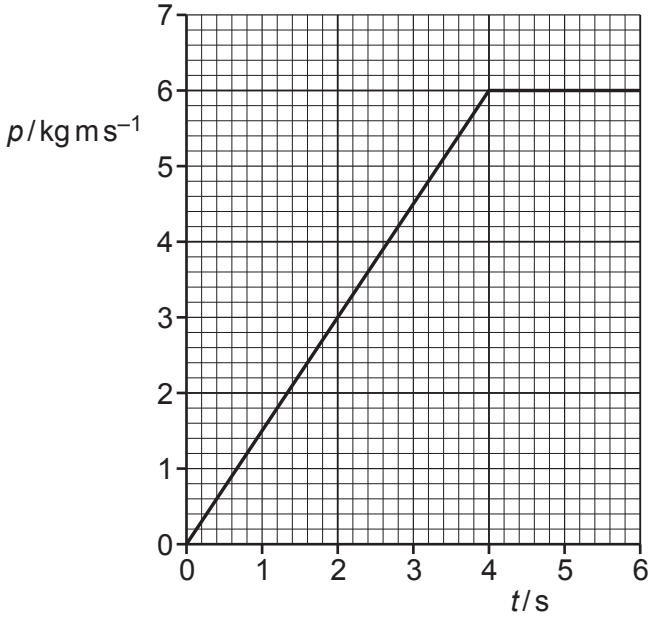

Fig. 3.2

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

.....

..... [1]

(b) Use Fig. 3.2 to determine, for the block at time $t = 2.0\,s$, 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 $t = 6.0\,s$.

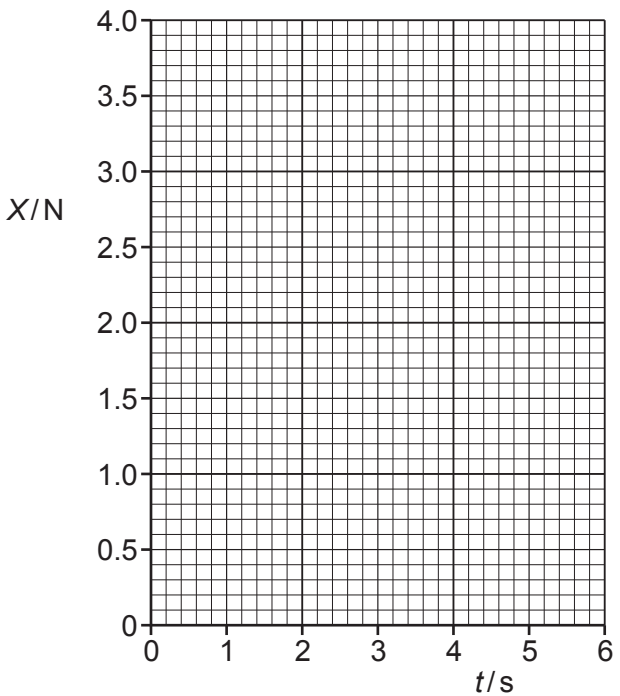

Fig. 3.3

[3]

[Total: 6]