**1** A 3.8 kg block on a plane inclined at 15° has initial speed of 5.0 m s$^{-1}$ when a horizontal force $F$ of magnitude 25 N acts on it as shown in Fig. 1.1.
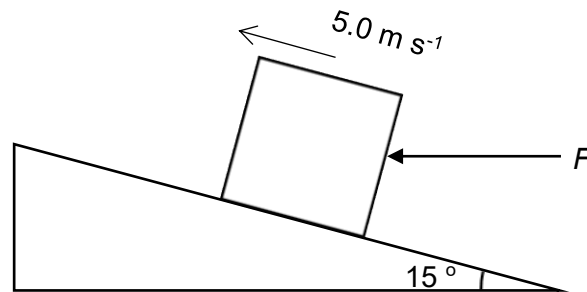


**Fig. 1.1**

**(a)** Determine the normal contact force exerted by the plane on the block.

normal contact force = ......................... N [2]

**(b)** The coefficient of kinetic friction, $\mu$, is 0.40 and the kinetic friction, $f$, is related to the normal contact force, $N$, by the equation

$$f = \mu N .$$

**(i)** Calculate the magnitude of the acceleration of the block.

acceleration = ........................................ m s$^{-2}$ [2]

**(ii)** Determine the distance travelled by the block before it comes to rest.

distance = .................................... m  [2]

**(iii)** Static friction is a force that acts on an object when it is at rest. It must be overcome before the object can start moving.

Considering that the maximum possible static friction between the object and the plane is equal to the value of the kinetic friction, *f*, state and explain, whether the block will slide down the plane after coming to rest if force *F* continues to act on the block.

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[2]

[Total: 8]