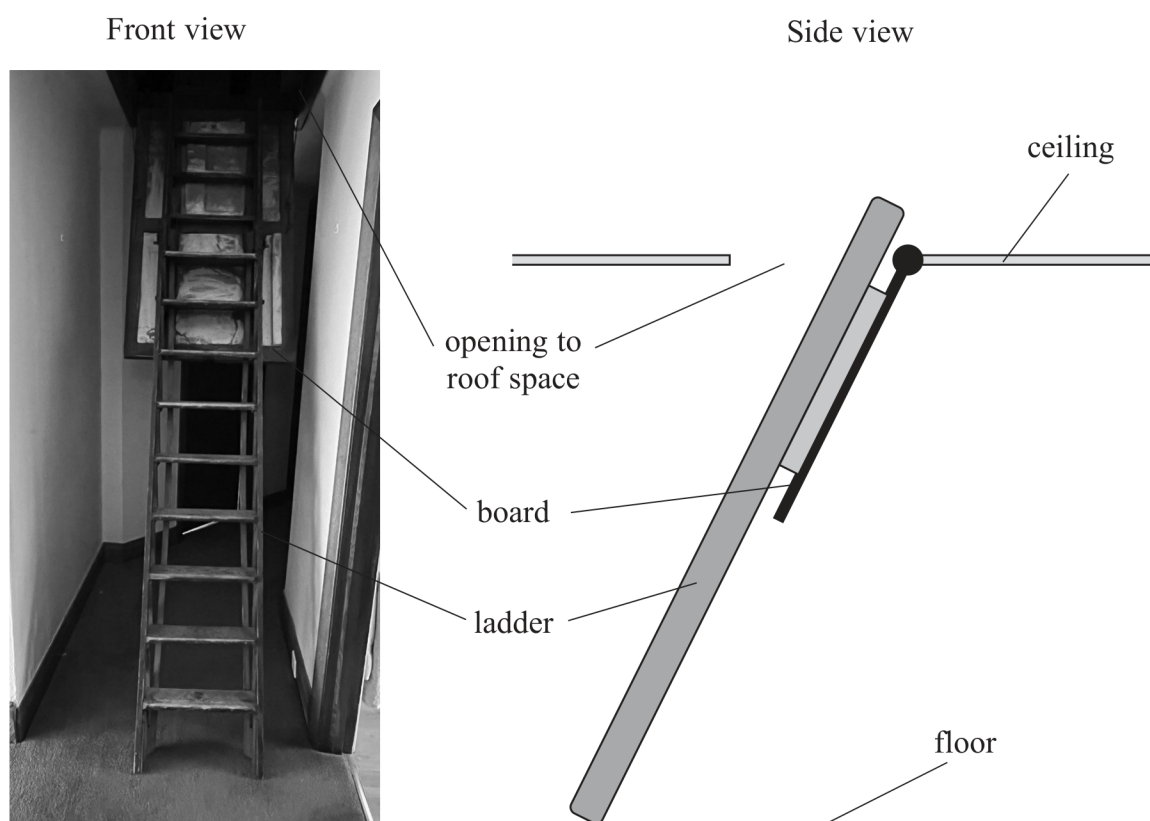
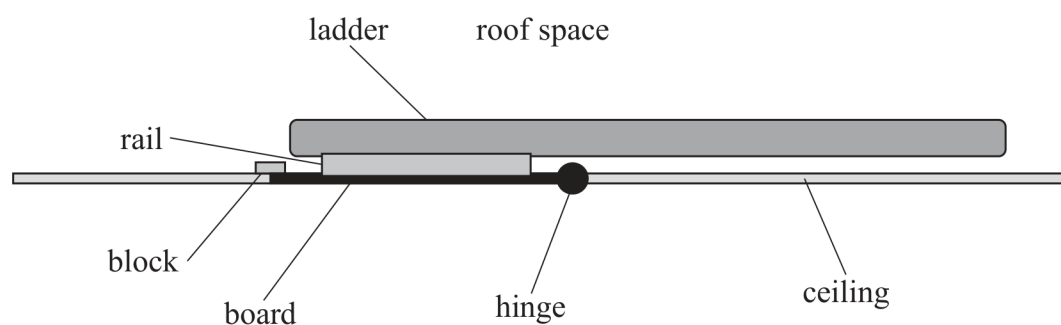


- 15 The photograph shows a ladder that a person can use to climb into the roof space of a building.



When not in use, the ladder is stored in the roof space and the opening to the roof space is covered by a board. The board is hinged to the ceiling at one end.

The ladder is attached to the board by a rail, as shown below. A small block prevents the board from rotating into the roof space.

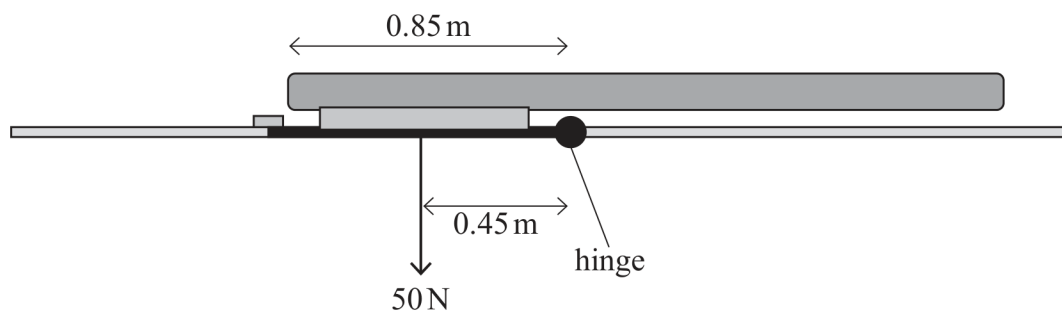


- (a) State what is meant by the centre of gravity of an object.

(1)

- (b) The weight of the board and rail is 50 N. The weight acts at a distance of 0.45 m from the hinge as shown.

The total length of the ladder is 2.70 m, with 0.85 m to the left of the hinge.



The weight of the ladder is 54 N. Assume the ladder is uniform.

- (i) Explain why the board and ladder remain in the position shown.

(5)

- (ii) A downward force is required to rotate the board away from the block. This force is applied 0.80 m from the hinge.

Determine the magnitude of this force.

(2)

Magnitude of force =

(Total for Question 15 = 8 marks)