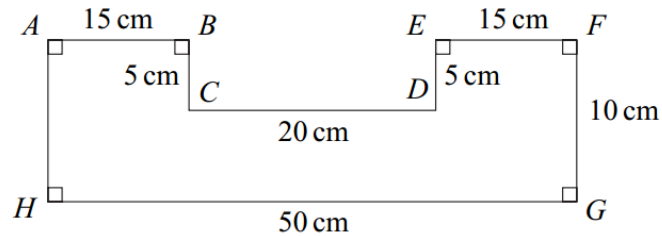


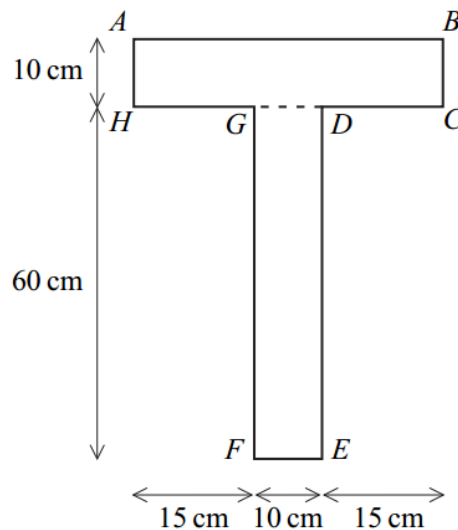
Mechanics 2 Centre of Mass

4 The diagram shows a uniform lamina $ABCDEFGH$.



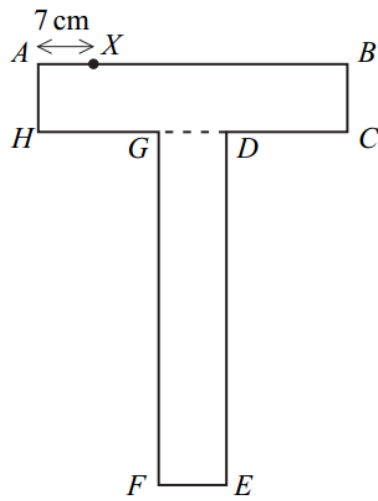
- (a) Explain why the centre of mass is 25 cm from AH . (1 mark)
 - (b) Show that the centre of mass is 4.375 cm from HG . (4 marks)
 - (c) The lamina is freely suspended from A . Find the angle between AB and the vertical when the lamina is in equilibrium. (4 marks)
 - (d) Explain, briefly, how you have used the fact that the lamina is uniform. (1 mark)
-

4 A uniform T-shaped lamina is formed by rigidly joining two rectangles $ABCH$ and $DEFG$, as shown in the diagram.



- (a) Show that the centre of mass of the lamina is 26 cm from the edge AB . (4 marks)
- (b) Explain why the centre of mass of the lamina is 5 cm from the edge GF . (1 mark)

(c) The point X is on the edge AB and is 7 cm from A , as shown in the diagram below.



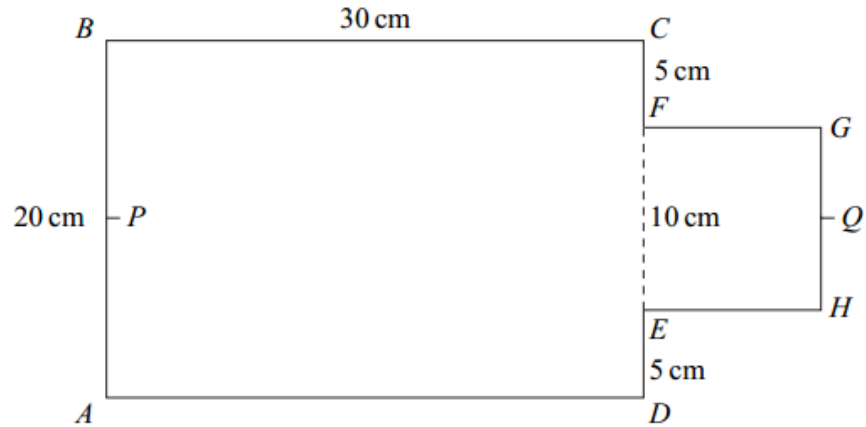
The lamina is freely suspended from X and hangs in equilibrium.

Find the angle between the edge AB and the vertical, giving your answer to the nearest degree. (4 marks)

- 2 A uniform lamina is in the shape of a rectangle $ABCD$ and a square $EFGH$, as shown in the diagram.

The length AB is 20 cm, the length BC is 30 cm, the length DE is 5 cm and the length EF is 10 cm.

The point P is the midpoint of AB and the point Q is the midpoint of HG .



- (a) Explain why the centre of mass of the lamina lies on PQ . (1 mark)
- (b) Find the distance of the centre of mass of the lamina from AB . (4 marks)
- (c) The lamina is freely suspended from A .

Find, to the nearest degree, the angle between AD and the vertical when the lamina is in equilibrium. (4 marks)
