5.

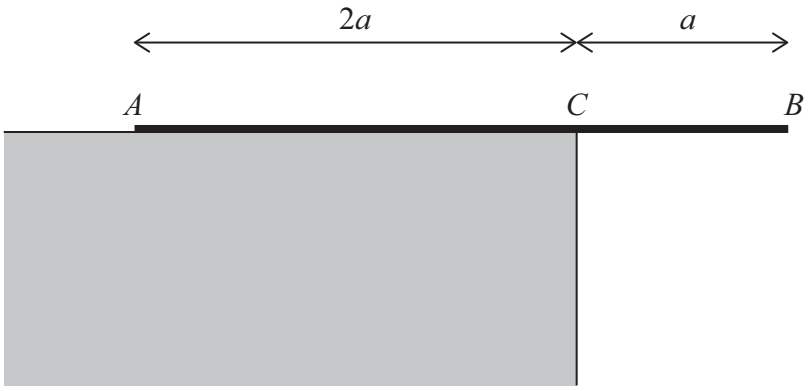

Figure 3

A non-uniform rod AB of length $3a$ rests in equilibrium on a horizontal ledge and overhangs the edge of the ledge at C.
The point C is such that $AC = 2a$ and $CB = a$, as shown in Figure 3.

The rod has weight W.

The distance of the centre of mass of the rod from A is d.

The rod is perpendicular to the edge of the ledge.

When a force of magnitude P, **acting vertically upwards**, is applied to the rod at B, the rod is on the point of tilting about A.

When the force applied at B is replaced by a force of magnitude $1.25P$, **acting vertically downwards** at B, the rod is on the point of tilting about C.

Find d in terms of a.

(6)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 5 continued

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 5 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 5 continued

(Total for Question 5 is 6 marks)