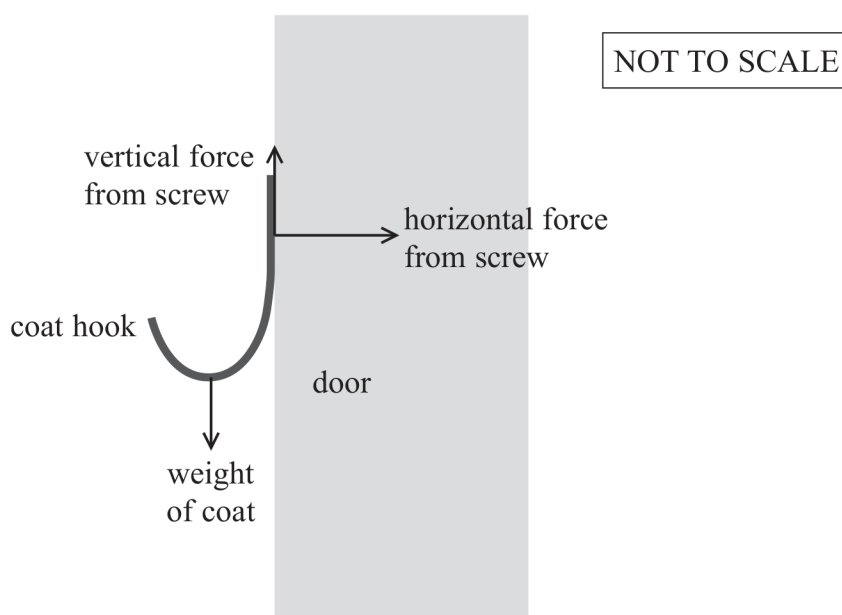**13** A coat hook is attached to a smooth door by a screw as shown.
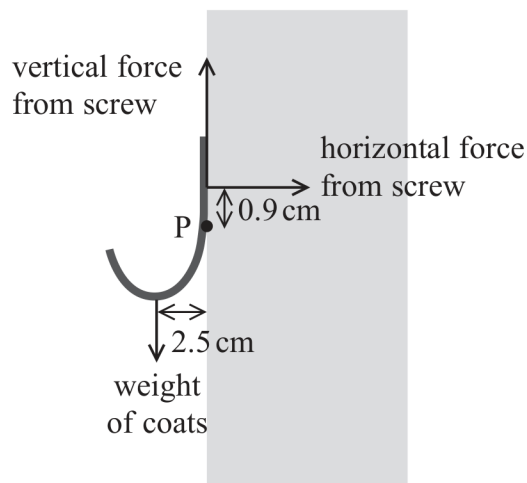

(a) The diagram below shows three of the forces that act on the coat hook when a coat is hung from it. The weight of the coat hook may be neglected.

NOT TO SCALE

vertical force from screw

horizontal force from screw

coat hook

door

weight of coat

Add a labelled arrow to the diagram to show the additional force required for the coat hook to be in equilibrium.

(2)

(b) If too many coats are hung on the coat hook, the hook will rotate and pull the screw out of the door. Point P is the position of the pivot as shown.

NOT TO SCALE

vertical force
from screw

horizontal force
from screw

P $\updownarrow$ 0.9 cm

$\leftrightarrow$
2.5 cm

weight
of coats

The maximum horizontal force from the screw is 150 N.

The mass of one coat is 2.6 kg.

Deduce whether a person could hang more than two of these coats from the hook.

(4)

....

....

....

....

....

....

....

....

(Total for Question 13 = 6 marks)