Oxford Cambridge and RSA

A Level Physics A

H556/01 Modelling physics

Question Set 27

1 A screw is used to hang a wooden sign on a wall. It is screwed into the wall using a screwdriver.

(a) The width of the screwdriver blade is 5.0×10^{-3} m from end to end.
The ends of the blade exert equal and opposite forces on the screw.
The magnitude of each force is 350 N, as shown in Fig. 22.1.

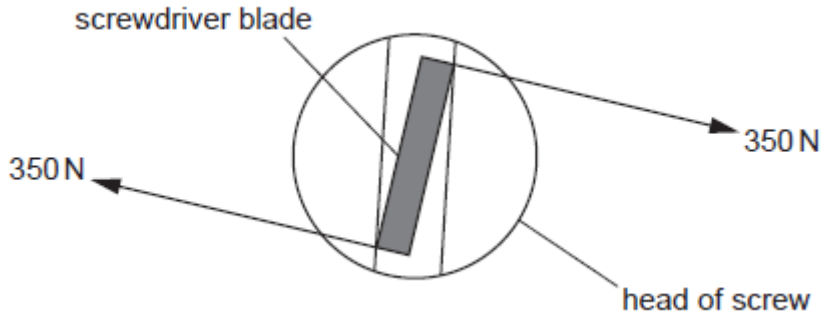

Fig. 22.1

Calculate the magnitude of the torque of the couple produced by the forces at each end of the screwdriver blade.

torque = ... N m **[1]**

(b) The wooden sign is then hung on the screw at point **A**.
The forces acting on the screw are shown in Fig. 22.2.

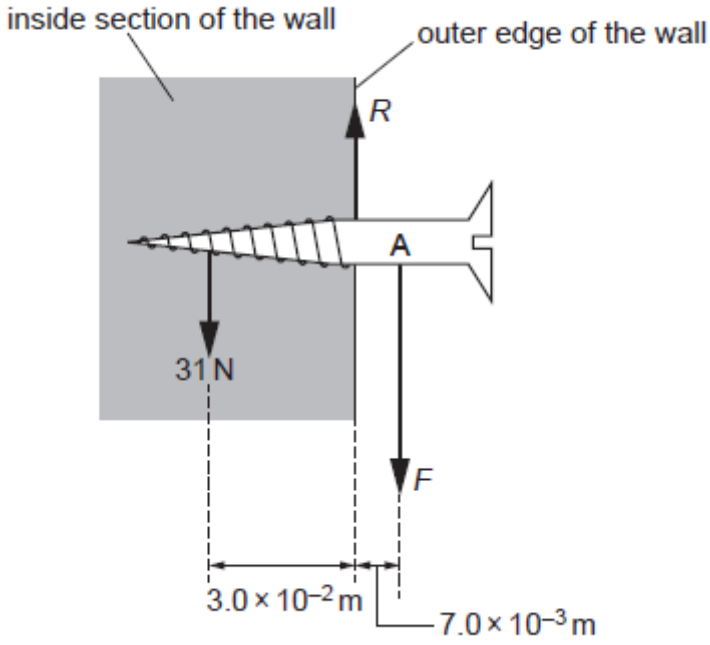

Fig. 22.2

The inside section of the wall exerts a maximum downwards force of 31 N at a distance of 3.0×10^{-2} m from the outer edge of the wall.
The hanging wooden sign exerts a force *F* at a distance 7.0×10^{-3} m from the outer edge of the wall.
There is a force *R* acting on the screw at the outer edge of the wall.The mass of the screw is negligible.

Use the principle of moments to calculate the maximum mass of the wooden sign.

mass = …….. kg **[3]**

Total Marks for Question Set 27: 4

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