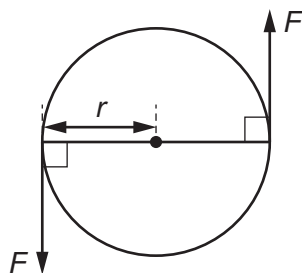
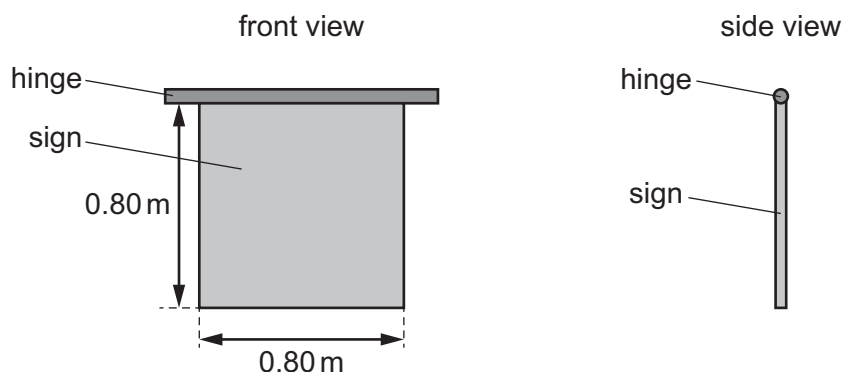


- 12 A disc of radius  $r$  is acted upon by two opposite forces, each of magnitude  $F$ . The forces form a couple, as shown.



What is the torque of this couple?

- A  $\frac{1}{2}Fr$       B  $Fr$       C  $2Fr$       D  $4Fr$
- 13 A uniform square sign of weight 40 N is suspended vertically from its top edge by a horizontal hinge, as shown.



The hinge is not frictionless. When the sign is displaced from the vertical by an external force and then released, it does not return to the vertical position.

The maximum torque exerted by the hinge on the sign is 6.0 N m. The sign is displaced by  $90^\circ$  so that it is horizontal and then gradually released.

At which angle to the vertical does the sign hang after release?

- A  $11^\circ$       B  $22^\circ$       C  $68^\circ$       D  $79^\circ$
- 14 Each foot of an elephant has a circular cross-section with a circumference of 1.4 m. The elephant has a mass of 5400 kg.

The elephant is standing still with all four feet on the ground. Assume the pressure under each foot is the same.

What is the approximate pressure exerted on the ground by each of the elephant's feet?

- A 8.7 kPa      B 35 kPa      C 85 kPa      D 340 kPa