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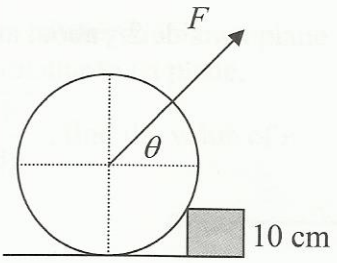
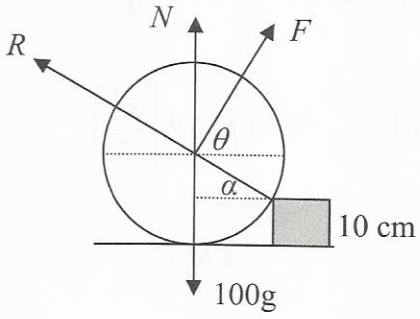
(b) A uniform disc of radius 25 cm and mass 100 kg rests in a vertical plane perpendicular to a kerb stone 10 cm high.



A force F is applied to the disc at an angle θ to the horizontal, where $\tan\theta = \frac{4}{3}$.

(i) Draw a diagram showing all the forces acting on the disc.

(ii) Find the least value of F required to raise the disc over the kerb stone.



$$\sin\alpha = \frac{15}{25} = \frac{3}{5}$$

horiz $\quad R\cos\alpha = F\cos\theta$

$$R = \frac{3}{4}F$$

vert $\quad R\sin\alpha + F\sin\theta + N = 100g$

$$N = 0$$

$$\left(\frac{3}{4}F\right)\left(\frac{3}{5}\right) + F\left(\frac{4}{5}\right) = 100g$$

$$F = 80g \quad \text{or} \quad 784\ \text{N}$$

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