

# NCERT/CBSE PHYSICS CLASS 11 textbook

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Answers to NCERT/CBSE PHYSICS Class 11(Class XI)textbook Exercise and Additional exercise

CHAPTER SEVEN

SYSTEM OF PARTICLES AND ROTATIONAL MOTION

EXERCISES

(For simplicity in numerical calculations, take  $g = 10 \text{ m s}^{-2}$ )

7.10 (a) Find the moment of inertia of a sphere about a tangent to the sphere, given the moment of inertia of the sphere about any of its diameters to be  $\frac{2MR^2}{5}$ , where  $M$  is the mass of the sphere and  $R$  is the radius of the sphere.

(b) Given the moment of inertia of a disc of mass  $M$  and radius  $R$  about any of its diameters to be  $\frac{MR^2}{4}$ , find its moment of inertia about an axis normal to the disc and passing through a point on its edge.

(a) By parallel axis theorem,

$$I_{\text{tangent}} = I_{\text{diameter}} + MR^2 = \frac{2}{5}MR^2 + MR^2 = \frac{7}{5}MR^2$$

(b)

We have to first find M.I. about an axis  $OA$  which is normal to plane of disc.

$$\text{By perpendicular axis theorem, } I_{OA} = \frac{1}{4}MR^2 + \frac{1}{4}MR^2 = \frac{1}{2}MR^2$$

Now by parallel axis theorem,

$$I_{\text{tangent}} = I_{\text{diameter}} + MR^2 = \frac{1}{2}MR^2 + MR^2 = \frac{3}{2}MR^2$$

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