

Solutions

Each answer shows the steps, then the **result**.

2.1

- point mass:

$$I = mr^2 = (3 \text{ kg})(2 \text{ m})^2$$

- $I = \mathbf{12 \text{ kg m}^2}$

2.2

- An object's resistance to a change in its rotation

2.3

- add the point-mass terms:

$$I = \sum mr^2 = (1 \text{ kg})(1 \text{ m})^2 + (1 \text{ kg})(2 \text{ m})^2$$

- $I = \mathbf{5 \text{ kg m}^2}$

2.4

- Four times (r is squared)

3.1 B

- mass and its distribution about the axis

3.2 B

- mr^2

3.3

(a)

- add the point-mass terms:

$$I = \sum mr^2 = (4 \text{ kg})(1.5 \text{ m})^2 + (2 \text{ kg})(3 \text{ m})^2 = 9 + 18$$

- $I = \mathbf{27 \text{ kg m}^2}$

(b)

- the 2 kg mass (18 kg m^2 against 9 kg m^2): it sits twice as far out and I grows with r^2

3.4

(a)

- The ring

(b)

- All the ring's mass is at the rim (maximum r), while the disc's mass is spread inward, lowering its I