

5 Rotational inertia, balance, and torque = I alpha – Part 2 —Answers

Answers

Work through these after you have tried the questions yourself.

2.1 the total mass, and how far that mass is spread from the axis of rotation.

2.2 $20 \times 1.5 = 25 \times d \Rightarrow d = \frac{30}{25} = 1.2 \text{ m}.$

2.3 $\alpha = \frac{\tau}{I} = \frac{8.0}{2.0} = 4.0 \text{ rad/s}^2.$

2.4 pulling her arms in brings her mass closer to the axis, lowering her rotational inertia I ; with angular momentum conserved, a smaller I means a larger ω , so she spins faster.

2.5 the total clockwise torque must equal the total anticlockwise torque (net torque zero).

2.6 $\tau = I\alpha = 5.0 \times 3.0 = 15 \text{ N m}.$