Mastering Physics Solutions Chapter 10 Rotational Kinematics and Energy

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Chapter 10 Rotational Kinematics and Energy Q.1CQ
A rigid object rotates about a fixed axis Do all points on the object have the same angular speed? Do all points on the object have the same linear speed? Explain
Solution:
Yes, all points on the rigid object have the same angular speed. but the linear speed is not the same at all points The linear speed near the point of the axis of rotation will be lower relative to points further away from the axis of rotation Thus, it can be increased by increasing the distance away from the axis of rotation ($v = r\omega$)
Chapter 10 Rotational Kinematics and Energy Q.1P
The following angles are given in degrees. Convert them to radians: 30°, 45°, 90°, 180°.
Solution:

$$1 \text{ rev} = 360° = 2\pi \text{ rad}$$

Thus,

$$30° = \frac{2\pi}{360} \times 30 \text{ rad}$$
$$= \boxed{\frac{\pi}{6} \text{rad}}$$

$$45° = \frac{2\pi}{360} \times 45 \text{ rad}$$
$$= \boxed{\frac{\pi}{4} \text{rad}}$$

$$90° = \frac{2\pi}{360} \times 90 \text{ rad}$$
$$= \boxed{\frac{\pi}{2} \text{rad}}$$

$$180° = \frac{2\pi}{180} \times 90 \text{ rad}$$
$$= \boxed{\pi \text{ rad}}$$