

Name:

Quiz (7)-Sec (9)-Ch(11&12)

S.N:

ID :

Key

Phys 101 (Term 032)-(F. Enaya)

Show your steps clearly for full credit.!!

Q1 A stone in the form of a uniform circular disk of radius 0.20 m and mass 14 kg can rotate about its axis. Starting from rest, it reaches an angular velocity of 44 rad/s in 10 s under the action of a constant torque. What is the instantaneous power at the end of this time interval?

$$\tau = I \alpha, \quad I = \left(\frac{1}{2} M R^2 \right) = 0.28 \text{ Kg.m}^2, \quad \omega = \alpha t \Rightarrow \alpha = 44/10 = 4.4 \text{ rad/s}^2$$

$$\therefore \tau = 0.28 \times 4.4 = 1.23 \text{ N.m.}$$

$$\text{Power(P)} = \tau \omega = 1.23 \times 4.4 = 54.2 \text{ W}$$

Q2. A uniform wheel of radius 0.5 m rolls without slipping on a horizontal surface. Starting from rest, the wheel moves with constant angular acceleration 6.0 rad/s². Find the distance traveled by the center of mass of the wheel from t = 0 to t = 3 s.

$$\Delta\theta = \frac{1}{2} \alpha t^2 = 27 \text{ rad.}$$

$$\Delta\theta = \Delta S / r \Rightarrow \Delta S \text{ (the distance)} = 27 \times 0.5 = 13.5 \text{ m}$$