SUVA SANGAM COLLEGE

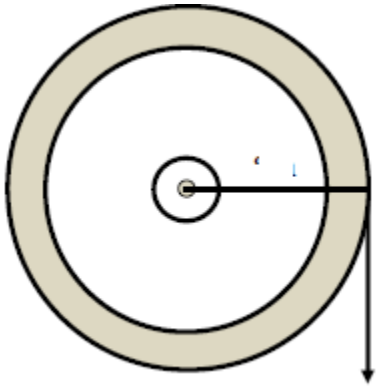
YEAR 13

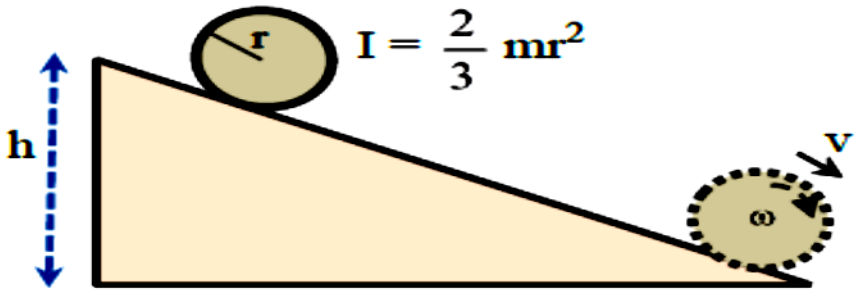
PHYSICS

WORKSHEET 7

Strand 1 P13.1	Mechanics
Sub-Strand P13.1.5	Rotational Dynamics
Content Learning Outcome P13.1.5.1	Apply the concept of both linear and rotational dynamics to solve problems.
Reference from Text	Pg 28 to 37

Questions

No.	**CONCEPT IN BRIEF**: Torque and angular acceleration: Torque $\tau = I$. Torque is also given by $\tau = F$r.
1.	A wheel with the radius of 0.9 m and a moment of inertia of 4.2 kgm^2 has a constant force of 15 N applied tangentially at the rim as shown below.  Calculate the a) angular acceleration b) angular speed, ω, after 4 s from rest.
	CONCEPT IN BRIEF: Law of conservation od angular momentum: $\boldsymbol{L_i = L_f \longrightarrow I\omega_1 = I\omega_2}$
2.	A solid disk having inertia of 3 kgm^2 rotates with an angular velocity of 10 radians per seconds. Another disk of inertia 4 kgm^2 which is not rotating is dropped on the first disk. If the two rotates together, find their common angular velocity.

	CONCEPT IN BRIEF: $E_{Total} = EK_{Rotational} + EK_{Linear}$ $= \frac{1}{2} I\omega^2 + \frac{1}{2} mv^2$
3.	A solid sphere of rotational inertia rolls from rest down a ramp of height, h. At the bottom of the ramp the disc has translational speed and angular velocity.  a) Write an expression for: i) the gravitational potential energy lost. ii) the translational kinetic energy. iii) the rotational kinetic energy. b) Determine the expression for linear velocity of the solid sphere.