SUVA SANGAM COLLEGE

YEAR 13

PHYSICS

WORKSHEET 6

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 24 to 27

Questions

No. **CONCEPT IN BRIEF**: Relation between linear and angular variables:

$s = r\theta$	$v = r\omega$	$a = r\alpha$

1. Fill in the blanks.
a) _____is the ratio of the length of arc and radius of the circle.
b) _____ is used to describe how quickly an object is rotating.
c) One revolution is _____ radian.
d) State the unit of the following:

Angular displacement	Angular velocity	Angular acceleration

2. A flywheel rotating at 500 Hz is brought to rest in 5 seconds.
a) Express 500 Hz in rad/s
b) Calculate the angular acceleration

CONCEPT IN BRIEF: Rotational Dynamics

Symbols

Variable	Linear	Angular
Speed / Velocity	u, v	ω_i , ω_f
Displacement	s	θ
Acceleration	a	α

Relationships

Linear	Angular
$v = u + at$	$\omega_f = \omega_i + \alpha t$
$s = ut + \frac{1}{2}at^2$	$\theta = \omega_i t + \frac{1}{2}\alpha t^2$
$v^2 = u^2 + 2as$	$\omega_f{}^2 = \omega_i{}^2 + 2\alpha\theta$

3. A flywheel, initially at rest, accelerates uniformly at 3 rad$s$−2 for 20 seconds.
Determine the following :

a) The angle it turned through during this time

b) The linear acceleration of a point 12cm from the centre of the wheel

c) The final angular velocity of the flywheel

d)The number of revolutions it makes before attaining its final angular velocity