2026 Sec 3 Advanced Physics Assignment 2

Dynamics: Motion in a Circle

Name: _____ ( ) Class: 3/ ___ Date: _____

Given formulae:

$v = r\omega$; $\quad a = \frac{v^2}{r}$

1 An object of mass 0.050 kg is moving in a circle of radius 0.10 m with a uniform angular velocity of 2.0 rad s^{-1}.

Calculate

(a) the speed of the object;

speed = …….

(b) its acceleration towards the centre of the circle; and

acceleration = …….

(c) its period of motion.

period = …….

2 The moon has a period of 27.5 days round the Earth. Calculate its speed in km per hour, assuming it moves uniformly in a circular orbit of radius 3.8×10^8 m.

speed = …….

3 A small object of mass 0.50 kg attached to the end of a string is whirled round in a horizontal circle of radius 2.0 m. The string breaks when the tension in it exceeds 100 N. Calculate the maximum angular velocity of the object.

maximum angular velocity = …….

4 A ball at the end of a 1.0-metre-long string is whirled round in a horizontal circle so that the string makes an angle of 30º to the vertical.

(a) Draw and label a free body diagram of the ball.

(b) Calculate the speed of the ball.

speed = …….

5 **H2 Physics 2014 Q12**

A car travels over a curved lump in the road at a speed of 20 m s^{-1}.

What is the minimum radius of curvature of the lump if the car is not to lose contact with the road?

radius = …….

Answers:	1(a) 0.20 m s^{-1} (b) 0.40 m s^{-2} (c) 3.1 s		2. 3600 km h^{-1}
	3. 10 rad s^{-1}	4(b) 1.7 m s^{-1}	5. 40 m