St. Lawrence High School

A Jesuit Christian Minority Institution

<u>Term : 1st</u>

Work Sheet – 20

Class – XI   Subject – Physics   Date – 08.07.20

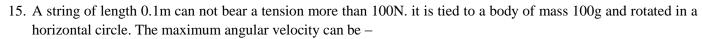Chapter – Circular motion   Topic – Centripetal acceleration & centripetal force

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Choose the correct option for the following questions. $1 \times 15 = 15$

1. A particle of mass m describes a circular motion of radius r. the centripetal acceleration of the particle is $\frac{4}{r^2}$. The momentum of the particle is –
   a. 2m/r
   b. $\frac{2m}{\sqrt{r}}$
   c. $\frac{4m}{\sqrt{r}}$
   d. $\frac{4m}{r}$

2. A particle is moving around a circular path of radius r with uniform angular speed w. The acceleration of the particle is –
   a. $\frac{w^2}{r}$
   b. $\frac{w}{r}$
   c. vw
   d. vr

3. A mass of 2kg is whirled in a horizontal circle by means of a string at an initial speed of 5r.p.m. keeping the radius constant the tension in the in the string is doubled, the new speed is nearly –
   a. 7r.p.m
   b. 14r.p.m
   c. 10r.p.m
   d. 20r.p.m

4. A particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity. The motion of the particle takes place in a plane. It follows that –
   a. Its velocity is constant
   b. Its K.E. is constant
   c. Its acceleration is constant
   d. It moves in a straight line

5. A stone is tied to one end of string 50cm long and is whirled in a horizontal circle with constant speed. If stone makes 10 revolutions in 20s, then what is the magnitude of acceleration of the stone ?
   a. 493 m/s^2
   b. 720 m/s^2
   c. 860 m/s^2
   d. 990 m/s^2

6. For a particle in a non uniform accelerated circular motion –
   a. Velocity is radial and acceleration is transverse
   b. Velocity is transverse and acceleration radial
   c. Velocity is radial and acceleration has both the components
   d. Velocity is transverse and acceleration has both the components

7. Two particles having mass M and m are moving in a circular path of radius R and r respectively. If their time period are same then the ratio of angular velocity will be –
   a. $\frac{r}{R}$
   b. $\frac{R}{r}$
   c. 1
   d. $\sqrt{\frac{R}{r}}$

8. A car moving with a speed 30m/s on a circular path of radius 500m. Its speed is increasing at the rate of 2m/s². The acceleration of the car is –
   a. 9.8 m/s²
   b. 1.8 m/s²
   c. 2 m/s²
   d. 2.7 m/s² .

9. If a particle is rotating uniformly in a horizontal circle, then –
   a. No force is acting on the particle
   b. Velocity of particle is constant
   c. Acceleration of the particle is zero
   d. No work is done

10. A particle moves along a circle of radius $\frac{20}{\pi}$ m with constant tangential acceleration. If the velocity of the particle is 80m/s at the end of the second revolution after motion has begun, the tangential acceleration is –
   a. 40 m/s².
   b. 640 m/s².
   c. 160 m/s².
   d. 40π m/s².

11. The linear and angular acceleration of a particle are 10 m/s² and 5rad/s² respectively. It will be at a distance from the axis of rotation –
   a. 50m
   b. 0.5m
   c. 1m
   d. 2m

12. The angular acceleration of particle moving along a circular path with uniform speed –
   a. Uniform but non zero
   b. Zero
   c. Variable
   d. As cannot be predicted from given information

13. If the speed and radius both are tripled for a body moving on a circular path, then the new centripetal force will be –
   a. Doubled
   b. Same
   c. Triple
   d. One third

14. When a body moves with a constant speed along a circle –
   a. No acceleration is present
   b. No force acts
   c. Its velocity remains constant
   d. No work is done on it

15. A string of length 0.1m can not bear a tension more than 100N. it is tied to a body of mass 100g and rotated in a horizontal circle. The maximum angular velocity can be –
    a. 100rad/s
    b. 1000rad/s
    c. 10000rad/s
    d. 0.1rad/s

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