

St. Lawrence High School A Jesuit Christian Minority Institution <u>Term : 1<sup>st</sup></u> Solution of Work Sheet – 20 Subject – Physics



Class - XI

Chapter – Circular motion

Date - 08.07.20

Topic – Centripetal acceleration & centripetal force

Choose the correct option for the following questions.

- 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.  $\frac{4m}{5}$
  - C.  $\sqrt{r}$
  - d.  $\frac{4m}{m}$
- 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
  - <mark>a. 7r.p.m</mark>
  - 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<sup>2</sup>

- b. 720 m/s<sup>2</sup>
- c.  $860 \text{ m/s}^2$
- 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



 $1 \times 15 = 15$ 

- 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/s<sup>2</sup>. The acceleration of the car is
  - a. 9.8 m/s<sup>2</sup>
  - b. 1.8 m/s<sup>2</sup>
  - c.  $2 \text{ m/s}^2$
  - d.  $2.7 \text{ m/s}^2$ .
- 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.  $\frac{40 \text{ m/s}^2}{\text{m}^2}$ .
  - b. 640 m/s<sup>2</sup>.
  - c.  $160 \text{ m/s}^2$ .
  - d.  $40\pi \text{ m/s}^2$ .
- 11. The linear and angular acceleration of a particle are 10  $\text{m/s}^2$  and  $5\text{rad/s}^2$  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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