Yakeen NEET 2.0 2026

Motion in a Plane

Assignment-04
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1. Angular velocity of minute hand of a clock is:

(1) $\frac{2\pi}{1800}$ rad/s (2) 8π rad/s

(3) $\frac{\pi}{1800}$ rad/s (4) $\frac{\pi}{30}$ rad/s

2. An object moving in a circular path at constant speed has constant

(1) Energy (2) Velocity

(3) Acceleration (4) Displacement

3. The angle between velocity vector and acceleration vector in uniform circular motion is:

(1) 0° (2) 180°

(3) 90° (4) 45°

4. Two cyclists cycle along circular tracks of radii R_1 and R_2 at uniform rates. If both of them take same time to complete one revolution, then their angular speeds are in the ratio

(1) $R_1 : R_2$ (2) $R_2 : R$

(3) 1 : 1 (4) $R_1R_2 : 1$

5. Centripetal acceleration of a cyclist completing acceleration of a cyclist completing 7 rounds in a minute along a circular track of radius 5m with a constant speed, is

(1) 2.7 m/s^2 (2) 4 m/s^2

(3) 3.78 m/s^2 (4) 6 m/s^2

6. A body is moving on a circle of radius 80 m with a speed 20 m/s which is decreasing at the rate 5 m/s? at an instant. The angle made by its acceleration with its velocity is

(1) 45° (2) 90°

(3) 135° (4) 0°

7. A car is moving at a speed of 40 m/s on a circular track of radius 400 m. The speed is increasing at the rate of 3 m/s. The acceleration of car is

(1) 4 m/s^2 (2) 7 m/s^2

(3) 5 m/s^2 (4) 3 m/s^2

8. A car is going round a circle of radius R_1 with constant speed. Another car is going round a circle of radius R_2 with constant speed. If both of them take same time to complete the circles, the ratio of their angular speeds and linear speeds will be

(1) $\sqrt{\frac{R_1}{R_2}}, \frac{R_1}{R_2}$ (2) 1, 1

(3) $1, \frac{R_1}{R_2}$ (4) $\frac{R_1}{R_2}$

9. If θ is angle between the velocity and acceleration of a particle moving on a circular path with decreasing speed, then

(1) $\theta = 90°$ (2) $0° < \theta < 90°$

(3) $90° < \theta < 180°$ (4) $0° \le \theta \le 180°$

10. The distance of a particle moving on a circle of radius 12 m measured from a fixed point on the circle and measured along the circle is given by $s = 2t^3$ (in meters). The ratio of its tangential to centripetal acceleration at $t = 2$ sec.

(1) 4 : 1 (2) 1 : 2

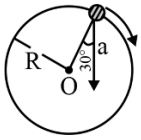
(3) 2 : 1 (4) 3 : 1

11. A motor car is travelling at 30 m/sec on a circular road of radius 500 m. I t is increasing its speed at the rate of 2.0 ms^{-2}. The total acceleration is:

(1) 1.8 ms^{-2} (2) 2 ms^{-2}

(3) 3.8 ms^{-2} (4) 2.7 ms^{-2}

12. In the given figure, $a = 15\ m\ s^{-2}$ represents the total acceleration of a particle moving in the clockwise direction in a circle of radius $R = 2.5$ m at a given instant of time. The speed of the particle is



(1) $4.5\ m\ s^{-1}$ (2) $5.0\ m\ s^{-1}$

(3) $5.7\ m\ s^{-1}$ (4) $6.2\ m\ s^{-1}$

13. A car moves on a circular path such that its speed is given by $v = Kt$, where K= constant and t is time. Also given: radius of the circular path is r. The net acceleration of the car at time t will be

(1) $\sqrt{K^2 + \left(\frac{K^2t^2}{r}\right)^2}$ (2) $2K$

(3) K (4) $\sqrt{K^2 + K^2t^2}$

14. If the equation for the displacement of a particle moving on a circular path is given by $(\theta) = 2t^3 + 0.5$, where θ is in radians and t in seconds, then the angular velocity of the particle after 2s from its start is:

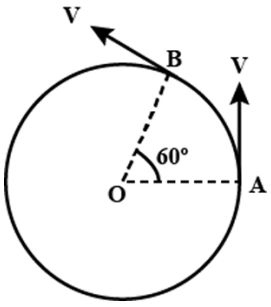
(1) 8 rad/s (2) 12 rad/s

(3) 24 rad/s (4) 36 rad/s

15. In uniform circular motion acceleration is:

(1) Constant (2) Variable

16. A particles is moving in a circle of radius r having centre at O, with a constant speed v. The magnitude of change in velocity in moving from A to B is



(1) $2v$ (2) 0

(3) $\sqrt{3}v$ (4) v

17. A body revolves with constant speed v in a circular path of radius r. The magnitude of its average acceleration during motion between two points in diametrically opposite direction is

(1) zero (2) $\frac{v^2}{r}$

(3) $\frac{2v^2}{\pi r}$ (4) $\frac{v^2}{2r}$

18. The position vector of a particle $\vec{R}$ as a function of time is given by $\vec{R} = 4\sin(2\pi t)\hat{i} + 4\cos(2\pi t)\hat{j}$, where R is in meters, t is in seconds and $\hat{i}$ and $\hat{j}$ denote unit vectors along x-and y-directions, respectively. Which one of the following statements is wrong for the motion of particle?

(1) Path of the particle is a circle of radius 4 m

(2) Acceleration vector of along $-\vec{R}$

(3) Magnitude of acceleration vector is v^2/R, where v is the velocity of particle

(4) Magnitude of the velocity of particle is 8 meter/second

19. A particle moves so that its position vector is given by $\vec{r} = \cos\omega t\,\hat{x} + \sin\omega t\,\hat{y}$, where ω is a constant. Which of the following is true?

(1) Velocity is perpendicular to $\vec{r}$ and acceleration is directed away from the origin.

(2) Velocity and acceleration both the perpendicular to $\vec{r}$

(3) Velocity and acceleration both are parallel to $\vec{r}$.

(4) Velocity is perpendicular to $\vec{r}$ and acceleration is directed towards the origin.

20. A particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the particle, the motion of the particle takes place in a plane. It follows that:

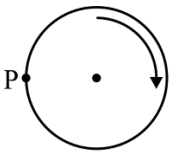
(1) Its velocity is constant

(2) Its acceleration is constant

(3) Its kinetic energy is constant

(4) It moves in a straight line

21. A music CD of 'Bajirao Mastani' is rotating clockwise (as shown). After turning it off, the CD slows down. Assuming it has not come to a stop yet, the direction of acceleration at point P is:



(1)  (2)

(3)  (4) 

22. A particle is moving around a circular path with uniform angular speed (ω). The radius of the circular path is *r*. The acceleration of the particle is:

(1) $\frac{\omega^2}{r}$ (2) $\frac{\omega}{r}$

(3) $v\omega$ (4) vr

23. A particle moves in a circle of radius 5 cm with constant speed and time period 0.2π s. The acceleration of the particle is

(1) 15 m/s^2 (2) 25 m/s^2

(3) 36 m/s^2 (4) 5 m/s^2

24. A stone tied to the end of a string of 1 m long is whirled in a horizontal circle with a constant speed. If the stone makes 22 revolutions in 44 seconds, what is the magnitude and direction of acceleration of the stone?

(1) π^2 m s^{-2} and direction along the radius towards the centre

(2) π^2 m s^{-2} and direction along the radius away from the centre

(3) π^2 m s^{-2} and direction along the tangent to the circle

(4) $\pi^2/4$ m s^{-2} and direction along the radius towards the centre

25. The angular speed of a flywheel making 120 revolutions/minute is

(1) 4π rad/s (2) $4\pi^2$ rad/s

(3) π rad/s (4) 2π rad/s

26. A particle of mass 10g moves along a circle of radius 6.4 cm with a constant tangential acceleration. What is the magnitude of this acceleration, if the kinetic energy of the particle becomes equal to 8×10^{-4} J by the end of the second revolution after the beginning of the motion?

(1) 0.15 m/s^2 (2) 0.18 m/s^2

(3) 0.2 m/s^2 (4) 0.1 m/s^2

27. The radius vector of a particle moving on a circle is given by $\vec{r} = A\cos Bt\,\hat{i} + A\sin Bt\,\hat{j}$ (A and B are constants). The radius of the circle and speed of the particle, respectively, are

(1) A, AB (2) A, A^2/B

(3) B, AB (4) B, A^2/B

28. A particle starts moving on a circular path from rest, such that its tangential acceleration varies with time as $a_t = kt$. Distance traveled by particle on the circular path in time t is

(1) $\frac{kt^3}{3}$ (2) $\frac{kt^2}{6}$

(3) $\frac{kt^3}{6}$ (4) $\frac{kt^2}{2}$

ANSWER KEY

1.	(2)	15.	(2)
2.	(1)	16.	(4)
3.	(3)	17.	(3)
4.	(3)	18.	(4)
5.	(1)	19.	(4)
6.	(3)	20.	(3)
7.	(3)	21.	(4)
8.	(2)	22.	(3)
9.	(2)	23.	(4)
10.	(2)	24.	(1)
11.	(4)	25.	(1)
12.	(3)	26.	(4)
13.	(1)	27.	(3)
14.	(3)	28.	(3)

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