



Uniform Circular Motion

21. A tachometer is a device to measure
- Gravitational pull
 - Speed of rotation
 - Surface tension
 - Tension in a spring

22. Two bodies of mass 10 kg and 5 kg moving in concentric orbits of radii R and r such that their periods are the same. Then the ratio between their centripetal acceleration is
- R/r
 - r/R
 - R^2/r^2
 - r^2/R^2

23. The ratio of angular speeds of minute hand and hour hand of a watch is
- 1 : 12
 - 6 : 1
 - 12 : 1
 - 1 : 6

24. A car travels north with a uniform velocity. It goes over a piece of mud which sticks to the tyre. The particles of the mud, as it leaves the ground are thrown
- Vertically upwards
 - Vertically inwards
 - Towards north
 - Towards south

25. An aircraft executes a horizontal loop with a speed of 150 m/s with its wings banked at an angle of 12° . The radius of the loop is ($g = 10 \text{ m/s}^2$)
- 10.6 km
 - 9.6 km
 - 7.4 km
 - 5.8 km

26. A particle is moving in a horizontal circle with constant speed. It has constant
- Velocity
 - Acceleration
 - Kinetic energy
 - Displacement

27. A motor cyclist moving with a velocity of 72 km/hour on a flat road takes a turn on the road at a point where the radius of curvature of the road is 20 meters. The acceleration due to gravity is 10 m/sec^2 . In order to avoid skidding, he must not bend with respect to the vertical plane by an angle greater than
- $\theta = \tan^{-1} 6$
 - $\theta = \tan^{-1} 2$
 - $\theta = \tan^{-1} 25.92$
 - $\theta = \tan^{-1} 4$



28. A train is moving towards north. At one place it turns towards north-east, here we observe that
- The radius of curvature of outer rail will be greater than that of the inner rail
 - The radius of the inner rail will be greater than that of the outer rail
 - The radius of curvature of one of the rails will be greater
 - The radius of curvature of the outer and inner rails will be the same
29. The angular speed of a fly wheel making 120 *revolutions/minute* is
- $2\pi \text{ rad/s}$
 - $4\pi^2 \text{ rad/s}$
 - $\pi \text{ rad/s}$
 - $4\pi \text{ rad/s}$
30. A particle is moving on a circular path with constant speed, then its acceleration will be
- Zero
 - External radial acceleration
 - Internal radial acceleration
 - Constant acceleration
31. A car is moving on a circular path and takes a turn. If R_1 and R_2 be the reactions on the inner and outer wheels respectively, then
- $R_1 = R_2$
 - $R_1 < R_2$
 - $R_1 > R_2$
 - $R_1 \geq R_2$
32. A mass of 100 *gm* is tied to one end of a string 2 *m* long. The body is revolving in a horizontal circle making a maximum of 200 revolutions per min. The other end of the string is fixed at the centre of the circle of revolution. The maximum tension that the string can bear is (approximately)
- 8.76 *N*
 - 8.94 *N*
 - 89.42 *N*
 - 87.64 *N*
33. A road is 10 *m* wide. Its radius of curvature is 50 *m*. The outer edge is above the lower edge by a distance of 1.5 *m*. This road is most suited for the velocity
- 2.5 *m/sec*
 - 4.5 *m/sec*
 - 6.5 *m/sec*
 - 8.5 *m/sec*
34. Certain neutron stars are believed to be rotating at about 1 *rev/sec*. If such a star has a radius of 20 *km*, the acceleration of an object on the equator of the star will be



- (a) $20 \times 10^8 m/sec^2$
(b) $8 \times 10^5 m/sec^2$
(c) $120 \times 10^5 m/sec^2$
(d) $4 \times 10^8 m/sec^2$
35. A particle revolves round a circular path. The acceleration of the particle is
(a) Along the circumference of the circle
(b) Along the tangent
(c) Along the radius
(d) Zero
36. The length of second's hand in a watch is 1 cm. The change in velocity of its tip in 15 seconds is
(a) Zero
(b) $\frac{\pi}{30\sqrt{2}} cm/sec$
(c) $\frac{\pi}{30} cm/sec$
(d) $\frac{\pi\sqrt{2}}{30} cm/sec$
37. A particle moves in a circle of radius 25 cm at two revolutions per second. The acceleration of the particle in m/s^2 is
(a) π^2
(b) $8\pi^2$
(c) $4\pi^2$
(d) $2\pi^2$
38. An electric fan has blades of length 30 cm as measured from the axis of rotation. If the fan is rotating at 1200 r.p.m. The acceleration of a point on the tip of the blade is about
(a) $1600 m/sec^2$
(b) $4740 m/sec^2$
(c) $2370 m/sec^2$
(d) $5055 m/sec^2$
39. The force required to keep a body in uniform circular motion is
(a) Centripetal force
(b) Centrifugal force
(c) Resistance
(d) None of the above
40. Cream gets separated out of milk when it is churned, it is due to
(a) Gravitational force
(b) Centripetal force
(c) Centrifugal force
(d) Frictional force

