Uniform Circular Motion

1. If the body is moving in a circle of radius *r* with a constant speed v, its angular velocity is

(a) v^2/r (b) vr

(c) v/r (d) r/v

2. Two racing cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that each makes a complete circle in the same duration of time t. The ratio of the angular speed of the first to the second car is

(a) $m_1 : m_2$ (b) $r_1 : r_2$

(c) 1 : 1 (d) $m_1 r_1 : m_2 r_2$

3. A cyclist turns around a curve at 15 miles/hour. If he turns at double the speed, the tendency to overturn is

(a) Doubled (b)Quadrupled

(c) Halved (d)Unchanged

4. A body of mass m is moving in a circle of radius r with a constant speed v. The force on the body is $\frac{mv^2}{r}$ and is directed towards the centre. What is the work done by this force in moving the body over half the circumference of the circle

(a) $\frac{mv^2}{r} \times \pi r$ (b) Zero

(c) $\frac{mv^2}{r^2}$ (d) $\frac{\pi r^2}{mv^2}$

5. If a particle moves in a circle describing equal angles in equal times, its velocity vector

(a) Remains constant

(b) Changes in magnitude

(c) Changes in direction

(d) Changes both in magnitude and direction

6. A stone of mass m is tied to a string of length l and rotated in a circle with a constant speed v. If the string is released, the stone flies

(a) Radially outward

(b) Radially inward

(c) Tangentially outward

(d) With an acceleration $\frac{mv^2}{l}$

7. A body is moving in a circular path with a constant speed. It has

(a) A constant velocity

(b) A constant acceleration

(c) An acceleration of constant magnitude

(d) An acceleration which varies with time

8. A motor cyclist going round in a circular track at constant speed has

(a) Constant linear velocity

(b) Constant acceleration

(c) Constant angular velocity

(d) Constant force

9. A particle P is moving in a circle of radius $'a'$ with a uniform speed v. C is the centre of the circle and AB is a diameter. When passing through B the angular velocity of P about A and C are in the ratio

(a) 1 : 1 (b) 1 : 2

(c) 2 : 1 (d) 4 : 1

10. A car moving on a horizontal road may be thrown out of the road in taking a turn

(a) By the gravitational force

(b) Due to lack of sufficient centripetal force

(c) Due to rolling frictional force between tyre and road

(d) Due to the reaction of the ground

11. Two particles of equal masses are revolving in circular paths of radii r_1 and r_2 respectively with the same speed. The ratio of their centripetal forces is

(a) $\frac{r_2}{r_1}$ (b) $\sqrt{\frac{r_2}{r_1}}$

(c) $\left(\frac{r_1}{r_2}\right)^2$ (d) $\left(\frac{r_2}{r_1}\right)^2$

12. A particle moves with constant angular velocity in a circle. During the motion its

(a) Energy is conserved

(b) Momentum is conserved

(c) Energy and momentum both are conserved

(d) None of the above is conserved

13. A stone tied to a string is rotated in a circle. If the string is cut, the stone flies away from the circle because

(a) A centrifugal force acts on the stone

(b) A centripetal force acts on the stone

(c) Of its inertia

(d) Reaction of the centripetal force

14. A body is revolving with a constant speed along a circle. If its direction of motion is reversed but the speed remains the same, then which of the following statement is true

(a) The centripetal force will not suffer any change in magnitude

(b) The centripetal force will have its direction reversed

(c) The centripetal force will not suffer any change in direction

(d) The centripetal force would be doubled

15. When a body moves with a constant speed along a circle

(a) No work is done on it

(b) No acceleration is produced in the body

(c) No force acts on the body

(d) Its velocity remains constant

16. A body of mass m moves in a circular path with uniform angular velocity. The motion of the body has constant

(a) Acceleration (b) Velocity

(c) Momentum (d) Kinetic energy

17. On a railway curve, the outside rail is laid higher than the inside one so that resultant force exerted on the wheels of the rail car by the tops of the rails will

(a) Have a horizontal inward component

(b) Be vertical

(c) Equilibriate the centripetal force

(d) Be decreased

18. If the overbridge is concave instead of being convex, the thrust on the road at the lowest position will be

(a) $mg + \frac{mv^2}{r}$ (b) $mg - \frac{mv^2}{r}$

(c) $\frac{m^2v^2g}{r}$ (d) $\frac{v^2g}{r}$

19. A cyclist taking turn bends inwards while a car passenger taking same turn is thrown outwards. The reason is

a) Car is heavier than cycle

b) Car has four wheels while cycle has only two

c) Difference in the speed of the two

d) Cyclist has to counteract the centrifugal force while in the case

of car only the passenger is thrown by this force

20. A car sometimes overturns while taking a turn. When it overturns, it i

(a) The inner wheel which leaves the ground first

(b) The outer wheel which leaves the ground first

(c) Both the wheels leave the ground simultaneously

(d) Either wheel leaves the ground first