Physicsaholics

DPP – 3 (Circular Motion)

Q 1. The magnitude of the centripetal force acting on a body of mass m executing uniform motion in a circle of radius r with speed v is:
(a) mvr
(b) mv^2r
(c) $\frac{mv^2}{r}$
(d) $\frac{m}{v^2r}$

Q 2. 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 $\frac{mv^2}{l}$

Q 3. A stone tied at the end of a string 80 cm long is whirled in a horizontal circle with a constant speed. If the stone makes 25 revolutions in 14 s, what is the magnitude of acceleration of the stone?
(a) 90 m/s^2
(b) 100 m/s^2
(c) 110 m/s^2
(d) 120 m/s^2

Q 4. A stone of mass 0.5 kg is attached to a string of length 2m and is whirled in a horizontal circle. If the string can withstand a tension of 9N the maximum velocity with which the stone can be whirled is:
(a) 6 m/s
(b) 8 m/s
(c) 4 m/s
(d) 12 m/s

Q 5. A stone of mass 0 .25 kg tied to the end of a string is whirled round in a circle of radius 1.5 m with a speed of 40 rev/min in a horizontal plane What is the tension in the string?
(a) 6.1 N
(b) 4.2 N
(c) 8.5 N
(d) 6.7 N

Q 6. A mass of 2 kg is whirled in a horizontal circle by means of a string at an initial speed of 5 revolutions per minute. Keeping the radius constant, the tension in the string is doubled. The new speed is nearly:
(a) 14 rpm
(b) 10 rpm
(c) 2.25 rpm
(d) 7 rpm

Q 7. A string breaks if its tension exceeds 10 newtons. A stone of mass 250 gm tied to this string of length 10 cm is rotated in a horizontal circle. The maximum angular velocity of rotation can be:
(a) 20 rad/s
(b) 400 rad/s
(c) 80 rad/s
(d) 200 rad/s

Q 8. A ball of mass 0.1 Kg. is whirled in a horizontal circle of radius 1 m. by means of a string at an initial speed of 20 R.P.M. Keeping the radius constant, the tension in the string is reduced to one quarter of its initial value. The new speed is:

(a) 5 r.p.m.   (b) 10 r.p.m.

(c) 20 r.p.m.   (d) 40 r.p.m.

Q 9. If the radius of curvature of the path of two particles of mass 2kg and 4kg are in the ratio 1:2, then in order to have constant centripetal force, their velocity, should be in the ratio of

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

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

Q 10. In an atom for the electron to revolve around the nucleus, the necessary centripetal force is obtained from the following force exerted by the nucleus on the electron:

(a) Nuclear force

(b) Normal reaction force

(c) Magnetic force

(d) Electrostatic force

Q 11. Two bodies of equal masses revolve in circular orbits of radii R_1 and R_2 with the same period. Their centripetal forces are in the ratio:

(a) $\left(\frac{R_1}{R_2}\right)^2$ (b) $\left(\frac{R_2}{R_1}\right)^2$ (c) $\frac{R_1}{R_2}$ (d) $\sqrt{R_1 R_2}$

Q 12. Centrifugal force is pseudo force because:

(a) its magnitude is equal to centripetal force

(b) origin cannot be imaginary

(c) its direction is outward along radius

(d) it is not provided by any real force but it arises due to accelerated frame of reference

Answer Key

Q.1 c	Q.2 c	Q.3 b	Q.4 a	Q.5 d
Q.6 d	Q.7 a	Q.8 b	Q.9 a	Q.10 d
Q.11 c	Q.12 d			