



B-26/CLASSTEST-01/JAN25

NEET-UG - Physics

Time Allowed: 48 minutes

Maximum Marks: 40

1. The momentum of a body is: [2]
- a) a vector equal in magnitude to the product of mass and instantaneous velocity and direction being that of instantaneous velocity
- b) a scalar equal in magnitude to the product of mass and velocity
- c) a vector equal in magnitude to the product of mass and average speed and direction being that of velocity
- d) a vector equal in magnitude to the product of mass and acceleration and direction being that of velocity
2. Force is required: [2]
- a) only to keep an object moving
- b) only to stop a moving object
- c) to start a stationary object and to stop a moving object
- d) only to start a stationary object moving
3. A 75.0-kg painter climbs a ladder that is 2.75 m long leaning against a vertical wall. The ladder makes an angle of 30° with the wall. How much work does gravity do on the painter? [2]
- a) -1950 J
- b) -1850 J
- c) -2050 J
- d) -1750 J
4. How much work must be done by a force on 50 kg body in order to accelerate it from rest to $20 \frac{m}{s}$ in 10 s? [2]
- a) 2×10^4 J
- b) 10^3 J
- c) 10^4 J
- d) 2×10^3 J
5. The change in kinetic energy of a particle is equal to the [2]
- a) work done on it by some force.
- b) work done on it by the net force.
- c) work done on it by the aerodynamic force.
- d) loss in ambient kinetic energy.
6. If F is a force and d is the displacement in the direction of force then the work done by the force is given by [2]
- a) $2F.d$
- b) $-F.d$
- c) $F.d$
- d) $-2F.d$
7. A solid sphere is rotating freely about its symmetry axis in free space. The radius of the sphere is increased keeping its mass the same. Which of the following physical quantities would remain constant for the sphere? [2]
- a) Angular velocity
- b) Angular momentum
- c) Rotational kinetic energy
- d) Moment of inertia

8. Two bodies, A and B initially, at rest, move towards each other under mutual force of attraction. At the instant when the speed of A is v and that of B is $2v$, the speed of the centre of mass of the bodies is [2]

a) $2v$ b) $3v$
c) zero d) $1.5v$

9. Two bodies of different masses of 2 kg and 4 kg moving with velocities 2 m/s and 10 m/s towards each other due to mutual gravitational attraction. What is the velocity of their centre of mass? [2]

a) 6 m/s b) 8 m/s
c) 5 m/s d) zero

10. If a body moves through a distance greater than $2\pi R$ in one full rotation, then [2]

a) $v_{cm} \leq R\omega$ b) $v_{cm} > R\omega$
c) $v_{cm} < R\omega$ d) $v_{cm} \geq R\omega$

11. What is the distance of the centre of mass of a half ring from its centre if its radius is 0.5 m? [2]

a) $\frac{1}{3\pi}m$ b) $\frac{1}{\pi}m$
c) $\frac{2}{3\pi}m$ d) $\frac{1}{2\pi}m$

12. Three masses are placed on the x-axis: 300 g at origin, 500 g at $x = 40$ cm and 400 g at $x = 70$ cm. The distance of the centre of mass from the origin is [2]

a) 30 cm b) 40 cm
c) 45 cm d) 50 cm

13. The reduced mass of two particles having masses m and $2m$ is [2]

a) $2m$ b) $3m$
c) $\frac{m}{2}$ d) $\frac{2m}{3}$

14. Four particles of mass 2 kg, 3 kg, 4 kg and 8 kg are situated at the corners of a square of side length 2m. The centre of mass may be given as [2]

a) $\left(\frac{14}{17}, \frac{24}{17}\right)$ b) $\left(\frac{34}{18}, \frac{34}{18}\right)$
c) $\left(\frac{20\sqrt{2}}{18}, \frac{24\sqrt{2}}{18}\right)$ d) $\left(\frac{30}{18}, \frac{28}{18}\right)$

15. The total momentum of a system of particles is equal to: [2]

a) the product of the total mass of the system and the velocity of its centre of mass
b) the product of the total mass of the system and the average velocity of its centre of mass
c) the product of half the total mass of the system and the velocity of its centre of mass
d) the product of the total mass of the system and the speed of its centre of mass

16. Two spheres of masses M and $2M$ are initially at rest at a distance R apart. Due to mutual force of attraction, they approach each other. When they are at separation $\frac{R}{2}$, the acceleration of their centre of mass would be [2]

a) $12g$ b) 0
c) g d) $3g$

17. The angular velocity of a body changes from 1 rev/sec to 16 rev/sec. Without applying any external torque. The [2]

ratio of its radius of gyration in the two cases is:

- a) 1:16
- b) 4: 1
- c) 16:1
- d) 1:4

18. A mass is revolving in a circle, which is in the plane of the paper. The direction of angular acceleration if any, is: [2]

- a) Upward from the plane of the paper
- b) Tangential
- c) At right angles to the plane of the paper
- d) Towards the radius

19. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular velocity will be in the ratio [2]

- a) 1 : 2
- b) $\sqrt{2} : 1$
- c) 2 : 1
- d) 1 : $\sqrt{2}$

20. The angular velocity of a wheel increases from 100 rps to 300 rps in 10 s. The number of revolutions made during that time is [2]

- a) 1000
- b) 600
- c) 2000
- d) 1500

HPC