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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS
DPP
DAILY PRACTICE PROBLEMS
DPP NO. 1

PHYSICS: CENTER OF MASS

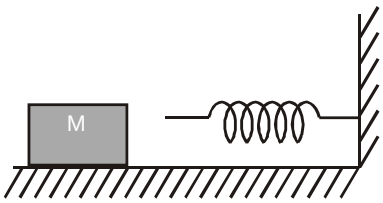
DPP No. : 1

1. The centre of mass of a body :
(1) Lies always at the geometrical centre
(2) Lies always inside the body
(3) Lies always outside the body
(4) Lies within or outside the body

2. A particle of mass 4m which is at rest explodes into three fragments. Two of the fragments each of mass m are found to move with a speed 'v' each in mutually perpendicular directions. The minimum energy released in the process of explosion is :
(1) (2/3) mv^2 (2) (3/2) mv^2 (3) (4/3) mv^2 (4) (3/4) mv^2

3. A ball of mass 50 gm is dropped from a height h = 10 m. It rebounds losing 75 percent of its kinetic energy. If it remains in contact with the ground for $\Delta t = 0.01$ sec., the impulse of the impact force is : (take g = 10 m/s^2)
(1) 1.3 N–s (2) 1.06 N-s (3) 1300 N–s (4) 105 N–s

4. The block of mass M moving on the frictionless horizontal surface collides with the spring of spring constant k and compresses it by length L. The maximum momentum of the block after collision is :



(1) $\sqrt{Mk}\,L$ (2) $\frac{kL^2}{2M}$ (3) zero (4) $\frac{ML^2}{k}$

5. Two masses of 1g and 4g are moving with equal kinetic energy. The ratio of the magnitude of their linear momentum is -
(1) 1 : 1 (2) 1 : 2 (3) 1 : 3 (4) 1 : 4

6. Two balls are thrown in air. The acceleration of the centre of mass of the two balls while in air (neglect air resistance)

(1) depends on the direction of the motion of the balls

(2) depends on the masses of the two balls

(3) depends on the speeds of the two balls

(4) is equal to g

7. The coefficient of resitution e for a perfectly elastic collision is :

(1) 1 (2) 0 (3) ∞ (4) –1

8. A stationary particle explodes into two particles of masses m_1 and m_2 which move in opposite directions with velocities v_1 and v_2 . The ratio of their kinetic energies E_1/E_2 is :-

(1) m_2/m_1 (2) m_1/m_2 (3) 1 (4) $m_1 v_2/m_2 v_1$

9. A bomb of mass 30 kg at rest explodes into two pieces of masses 18 kg and 12 kg. The velocity of 18 kg mass is 6 ms^{-1}. The kinetic energy of the other mass is :

(1) 256 J (2) 486 J (3) 524 J (4) 324 J

10. Two bodies of mass 1 kg and 3 kg have position vector $\hat{i}+2\hat{j}+\hat{k}$ and $-3\hat{i}-2\hat{j}+\hat{k}$ respectively. The centre of mass of this system has a position vector.

(1) $-2\hat{i}+2\hat{k}$ (2) $-2\hat{i}-\hat{j}+\hat{k}$ (3) $2\hat{i}-\hat{j}-2\hat{k}$ (4) $-\hat{i}+\hat{j}+\hat{k}$