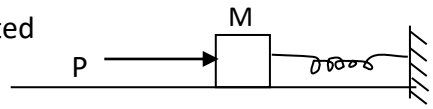
[Newton's Law of Motion]

Date of Examination_____ Answer sheet No:---------- Roll No:- **Test Id No..691**

Marking Scheme… **Total Marks – 125** Marks for one correct answer - **+5** & one wrong answer - (**-0.25**).

Type A- The questions have problems followed by alternative answers where only one of them is correct.

1. The block of mass 'm' as shown in the diagram is kept at rest on smooth surface by a force 'P' where the spring is under contracted condition. The magnitude of acceleration of the block just after removal of force 'P' is



(a) 2P/m (b) P/m (c) P/2m (d) None.

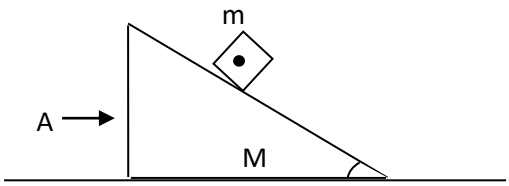
2. A body of mass 'm' is projected upward with speed 'u_o' it returns back to the ground with same speed 'u_o'. The magnitude of average force experienced by it during the whole period of motion is (where g is acceleration due to gravity).
(a) mg (b) mg/2 (c) 3mg/2 (d) 4mg

3. A particle of mass 5kg is pulled along a smooth horizontal string. The acceleration of the particle is $10m/s^2$. The tension in the string is
(a) 50N (b) 2N (c) 15N (d) 10N

4. A particle of mass 3kg slides down a smooth plane inclined at $\sin^{-1}(1/3)$ to horizontal. The acceleration of the particle is
(a) g m/s^2 (b) g/3 m/s^2 (c) 0 (d) 5 m/s^2

5. A raindrop of mass 0.2gm is falling with uniform velocity of 25 m/sec. Its weight will be ($g = 10m/s^2$)
(a) 0.02N (b) Zero (c) 0.002N (d) None

6. A block of mass 'm' is placed on a smooth incline plane of inclination θ with horizontal. The incline plane body 'M' is accelerated horizontally, so that body does not slide down. What is the vertical force exerted by the incline plane on the block.



(a) mgsinθ (b) mgcosθ
(c) mg (d) None

7. A body of mass 2 kg is acted upon by two forces each of magnitude 1 N making of 60^o with each other. The net acceleration of the body is (in m/s^2)
(a) $\sqrt{3}/2$ (b) $2/\sqrt{3}$ (c) $\sqrt{2}/3$ (d) None

8. The horizontal acceleration that should be given to a smooth inclined plane of angle of inclination θ. So that an object kept on it remains stationary relative to the incline
(a) g/tanθ (b) g/tanθ (c) tanθ/g (d) None

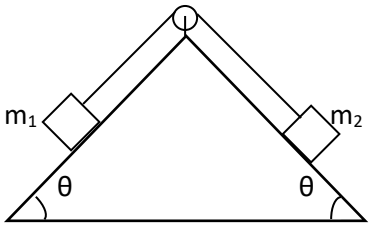
9. Two blocks of masses 2 kg and 1 kg are placed on a smooth horizontal table in contact with each other. A horizontal force of 3N is applied on the first block, so that the block accelerated together with constant acceleration. The force between the two blocks must be
(a) 1N (b) 2N (c) 3N (d) None

10. A monkey of mass 'm' is climbing a rope with uniform speed the tension in the rope will be
(a) more than mg (b) less than mg (c) equal to mg (d) None

11. A small sphere of mass 'm' is suspended by a string from the ceiling of a car. If the car begins to on straight road with constant acceleration. The tension is the string is

(a) T = mg (b) T > mg (c) T < mg (d) None

12. Two masses m_1 = 40 kg and m_2 = 30 kg are connected by a weightless string passing over a frictionless pulley as shown in the figure. The tension in the string will be (where θ = 30°)



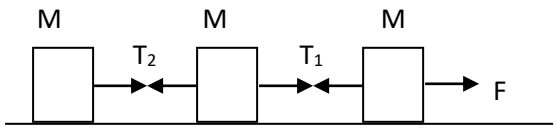
(a) 168 N (b) 288 N
(c) 368 N (d) None

13. The mass of the lift is 500 kg. What will be tension in the cable if the lift is accelerating at 2 m/s^2. (where g = 9.8 m/s^2)
(a) 5000N (b) 500N (c) 5900N (d) None

14. Three forces are acting on a particle of mass 'm' which is under equilibrium. If first two forces F_1 and F_2 are at right angle and third forces is removed suddenly the magnitude of the acceleration of the particle will be
(a) $|\vec{F_3}|/m$ (b) $[|\vec{F_1}| + |\vec{F_2}|]/m$ (c) $[|\vec{F_1}| - |\vec{F_2}|]/m$ (d) None

15. A shell of mass 1 kg comes out of the barrel of a gun of length 2m with speed of 80 m/s. The average force acting on it is
(a) 16N (b) 160N (c) 1600N (d) None

16. Three blocks of equal mass M connected by cord kept on smooth horizontal surface is being pulled by a force F as shown in the diagram. The tension T_1 & T_2 are



(a) $T_1 = 2F/3$, $T_2 = F/3$ (b) $T_1 = F/3$, $T_2 = 2F/3$
(c) $T_1 = T_2 = F/4$ (d) None

17. A projectile is thrown from a point which is 1m above ground level. Taking Y-axis as vertical it hits the ground when
(a) y = -1 (b) y = +1 (c) y = 0 (d) y = constant

18. A projectile is thrown with initial speed of 30m/s. Its maximum horizontal range if g = 10m/s^2.
(a) 900m (b) 90m (c) 30m (d) 9m

19. A projectile is thrown from ground level with an initial velocity $4\vec{i} + 3\vec{j}$. It reaches the greatest height above ground level after where g = 10m/s^2.
(a) 0.3sec (b) 0.24sec (c) 0.18sec (d) 1.8sec

20. A stone is thrown from a height of 10m above the ground with initial velocity of 10m/s at 30° below horizontal line. Taking Y-axis as vertical it hits the ground when
(a) y = -5m (b) y = -10m (c) dy/dt = -√225m/s (d) None.

21. What is the angle between $\vec{A} \times \vec{B}$ and $\vec{B} \times \vec{A}$
(a) π (b) π/2 (c) 0°C (d) None

22. The angle between $\vec{A}$ and $\vec{B}$ is θ. The value of $\vec{A} . (\vec{B} \times \vec{A})$ must be
(a) A^2B (b) Zero (c) AB^2 (d) AB cosθ

23. . If $\vec{A} . \vec{B}$ = AB then the angle between $\vec{A}$ and $\vec{B}$ is
(a) 0 (b) 30 (c) 180 (d) None

24. A small sphere of mass 'm' is suspended by a string from the ceiling of a room then tension must be
(a) T = mg (b) T > mg (c) T < mg (d) None

25. A particle is moving eastward with velocity of 5 m/sec in 10 sec the velocity changes to 5 m/sec northward. The average acceleration in this time is
(a) Zero (b) 1/√2 m/s^2 towards north-east.
(c) 1/√2 m/s^2 towards north- west. (d) ½ m/s^2 towards north.