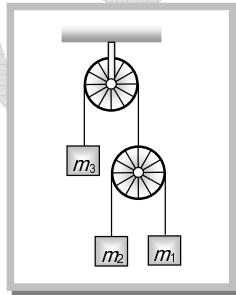
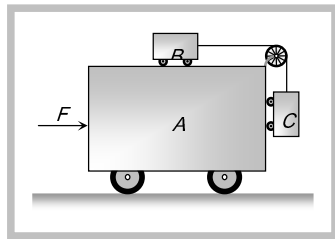


Newton Law of Motion

- A closed compartment containing gas is moving with some acceleration in horizontal direction. Neglect the effect of gravity. Then the pressure in the compartment is
 (a) Same everywhere (b) Lower in front side (c) Lower in rear side (d) Lower in upper side
- In a tug-of-war contest, two men pull on a horizontal rope from opposite sides. The winner will be the man who
 (a) Exerts greater force on the rope
 (b) Exerts greater force on the ground
 (c) Exerts a force on the rope which is greater than the tension in the rope
 (d) Makes a smaller angle with the vertical
- A shell is fired from a cannon with a velocity v at an angle θ with the horizontal direction. At the highest point in its path it explodes into two pieces of equal mass. One of the pieces retraces its path to the cannon and the speed of the other piece immediately after the explosion is
 (a) $3v \cos \theta$ (b) $2v \cos \theta$ (c) $\frac{3}{2}v \cos \theta$ (d) $\frac{\sqrt{3}}{2}v \cos \theta$
- A 60 kg man stands on a spring scale in the lift. At some instant he finds, scale reading has changed from 60 kg to 50 kg for a while and then comes back to the original mark. What should we conclude
 (a) The lift was in constant motion upwards
 (b) The lift was in constant motion downwards
 (c) The lift while in constant motion upwards, is stopped suddenly
 (d) The lift while in constant motion downwards, is suddenly stopped
- The mass of a body measured by a physical balance in a lift at rest is found to be m . If the lift is going up with an acceleration a , its mass will be measured as
 (a) $m\left(1 - \frac{a}{g}\right)$ (b) $m\left(1 + \frac{a}{g}\right)$ (c) m (d) Zero
- Three masses m_1 , m_2 and m_3 are attached to a string pulley system as shown. All three masses are held at rest and then released. To keep m_3 at rest, the condition is



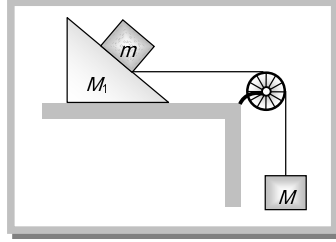
- $\frac{1}{m_3} = \frac{1}{m_1} + \frac{1}{m_2}$ (a) $\frac{1}{m_3} = \frac{1}{m_1} + \frac{1}{m_2}$ (b) $m_1 + m_2 = m_3$ (c) $\frac{4}{m_3} = \frac{1}{m_1} + \frac{1}{m_2}$ (d) $\frac{1}{m_1} + \frac{2}{m_2} = \frac{3}{m_3}$
- Two balls of mass 1 kg and 2 kg respectively are connected to the two ends of the spring. The two balls are pressed together and placed on a smooth table. When released, the lighter ball moves with an acceleration of 2 ms^{-2} . The acceleration of the heavier ball will be
 (a) 4 ms^{-2} (b) 2 ms^{-2} (c) 1 ms^{-2} (d) 0.5 ms^{-2}
- A frictionless cart A of mass 100 kg carries other two frictionless carts B and C having masses 8 kg and 4 kg respectively connected by a string passing over a pulley as shown in the figure. What horizontal force F must be applied on the cart so that smaller cart do not move relative to it



- (a) 150 N (b) 340 N (c) 560 N (d) 630 N

GRAVITY CLASSES

9. Find the mass M of the hanging block shown in figure. Which will prevent the smaller block from slipping over the triangular block. All the surfaces are frictionless and the strings and the pulleys are light



- (a) $\frac{m + M_1}{(\sin \theta - 1)}$ (b) $\frac{m + M_1}{(\cos \theta - 1)}$ (c) $\frac{m + M_1}{(\tan \theta - 1)}$ (d) $\frac{m + M_1}{(\cot \theta - 1)}$
10. A body kept on a smooth inclined plane having inclination θ will remain stationary relative to the inclined plane if the plane is given a horizontal acceleration equal to
- (a) $\sqrt{x^2 - 1}g$ (b) $\frac{\sqrt{x^2 - 1}}{x}g$ (c) $\frac{gx}{\sqrt{x^2 - 1}}$ (d) $\frac{g}{\sqrt{x^2 - 1}}$
11. Which of the following sets of concurrent forces may be in equilibrium
- (a) $F_1 = 3N, F_2 = 5N, F_3 = 9N$ (b) $F_1 = 3N, F_2 = 5N, F_3 = 1N$
 (c) $F_1 = 3N, F_2 = 5N, F_3 = 15N$ (d) $F_1 = 3N, F_2 = 5N, F_3 = 6N$
12. When forces F_1, F_2, F_3 are acting on a particle of mass m such that F_2 and F_3 are mutually perpendicular, then the particle remains stationary. If the force F_1 is now removed then the acceleration of the particle is
- (a) F_1 / m (b) $F_2 F_3 / m F_1$ (c) $(F_2 - F_3) / m$ (d) F_2 / m
13. A 2 kg block is lying on a smooth table which is connected to a body of mass 1 kg by a string which passes through a pulley. The 1 kg mass is hanging vertically. The acceleration of block and tension in the string will be
- (a) $3.27\text{ m/s}^2, 6.54\text{ N}$ (b) $4.38\text{ m/s}^2, 6.54\text{ N}$ (c) $3.27\text{ m/s}^2, 9.86\text{ N}$ (d) $4.38\text{ m/s}^2, 9.86\text{ N}$
14. If rope of lift breaks suddenly, the tension exerted by the surface of lift ($a =$ acceleration of lift)
- (a) mg (b) $m(g + a)$ (c) $m(g - a)$ (d) 0
15. Rocket works on the principle of conservation of
- (a) Mass (b) Energy (c) Momentum (d) None of the above