

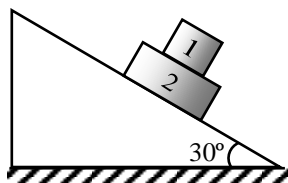
CLASS XI-PHYSICS

FRICTION

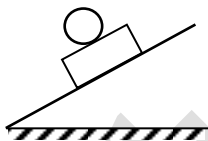
ASSIGNMENT-1

NUMERICAL QUESTIONS:

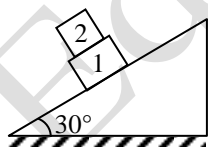
Q.1 Two blocks 1 and 2 of mass 2kg and 4kg are kept over a frictionless inclined surface (angle of inclination = 30°). Coefficient of friction between two blocks is $\mu = 0.2$. Friction force on block 1 is equal to (in Newton) -



Q.2 A cylinder of mass 5 kg is kept over a block of mass 10 kg which is kept on a fixed inclined plane. The surface between cylinder and block is rough ($\mu = 0.2$) while that between block and inclined plane is smooth. Friction force acting on cylinder is -

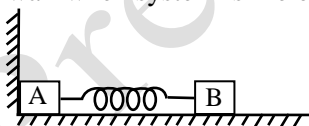


Q.3

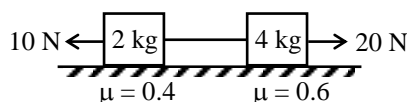


Two blocks of mass 2kg each are kept over fixed frictionless inclined plane as shown. Coefficient of friction between blocks is $\mu = 0.4$ Friction force on block 2 is -

Q.4 Two blocks A and B, each of mass $m = 2\text{kg}$ are connected to the ends of a ideal spring of force constant $k = 1000 \text{ Nm}^{-1}$ and this system is placed on rough floor. Coefficient of friction between these blocks and floor is $\mu = 0.5$. Block B is pressed towards left so that spring gets compressed. Then the initial minimum compression of spring in cm such that block A leaves contact with the wall when system is released is ($g = 10 \text{ m/s}^2$)



Q.5 Two blocks of mass 2 kg and 4 kg are connected through a massless inextensible string. Coefficient of friction between 2 kg block and ground is 0.4 and between 4 kg block and ground is 0.6. Two forces $F_1 = 10 \text{ N}$ and $F_2 = 20 \text{ N}$ are applied on the block as shown in figure. Friction force (in N) acting on 4 kg block minus 10 N is



- Q.6** A car begins to move at time $t = 0$ and then accelerates along a straight track with a velocity given by $V(t) = 2t^2 \text{ ms}^{-1}$ for $0 \leq t \leq 2$, where t is time in second. After the end of acceleration, the car continues to move at a constant speed. A small block initially at rest on the floor of the car begins to slip at $t = 1 \text{ s}$ and stops slipping at $t = 3 \text{ s}$. The coefficient of static and kinetic friction between the block and the floor are μ_s and μ_k respectively. Find the value of $\frac{3\mu_s}{\mu_k}$.
- Q.7** A 40 kg wooden crate is being pushed across a wooden floor with a force of 160 N. If $\mu_k = 0.3$, find the acceleration of the crate. ($g = 10 \text{ m/s}^2$)
- Q.8** A car with its brakes locked is on a horizontal plane. It will remain stationary till the angle made by plane with horizontal is 45° . What is the coefficient of static friction of rubber tires on dry concrete?