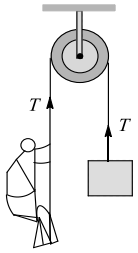
DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 2**

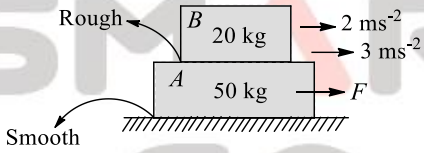
Topic :- LAWS OF MOTION

1. In order to raise a mass of 100 kg, a man of mass 60 kg fastens a rope to its and passes the rope over a smooth pulley. He climbs the rope with acceleration $5\ g/4$ relative to the rope. The tension in the rope is (take $g = 10\ ms^{-2}$)



a) $\frac{4875}{8}$ N b) $\frac{4875}{2}$ N c) $\frac{4875}{4}$ N d) $\frac{4875}{6}$ N

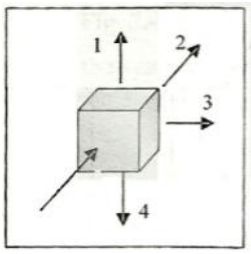
2. A 20 kg black is placed on top of 50 kg block as shown. An horizontal force F acting on A cause an acceleration of $3\ ms^{-2}$ to A and $2\ ms^{-2}$ to B as shown. For this situation, mark out the correct statement (s)



a) The friction force between A and B is 40 N b) The net force acting on A is 150 N

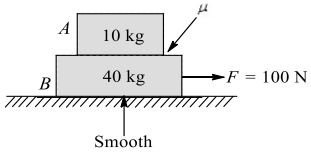
c) The value of F is 190 N d) The value of F is 150 N

3. A block is pressed against a vertical wall as shown in the figure



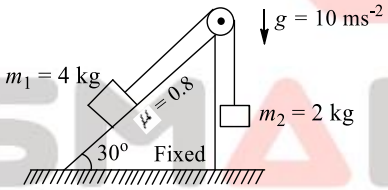
a) It is most easier to slide the block along 4
b) It is most difficult to slide the block along 1
c) It is equally easier or difficult to slide the block in any direction
d) It is most difficult to slide the block along 3

4. A 10 kg block is placed on top of 40 kg block as shown. A horizontal force F acting on B causes an acceleration of $2\ \text{ms}^{-2}$ to$B$. For this situations mark out the correct statement(s)



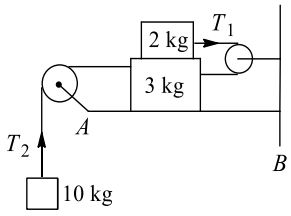
a) The acceleration of A may be $2\ \text{ms}^{-2}$ or less than $2\ \text{ms}^{-2}$
b) The acceleration of A must also be $2\ \text{ms}^{-2}$
c) The coefficient of friction between the blocks may be 0.2
d) The coefficient of friction between the blocks must be 0.2 only

5. Two blocks of masses m_1 and m_2 are connected through a massless inextensible string. Block of mass m_1 is placed at the fixed rigid inclined surface while the block of mass m_2 hanging at the other end of the string, which is passing through a fixed massless frictionless pulley shown in the figure. The coefficient of static friction between the block and the inclined plane is 0.8. the system of masses m_1 and m_2 is released from rest



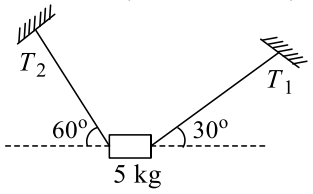
a) The tension in the string is 20 N after releasing the system
b) The contact force by the inclined surface on the block is along normal to the inclined surface
c) The magnitude of contact force by the inclined surface on the block m_1 is $20\sqrt{3}$ N
d) None of these

6. Coefficient of friction between the two blocks is 0.3. Whereas the surface AB is smooth



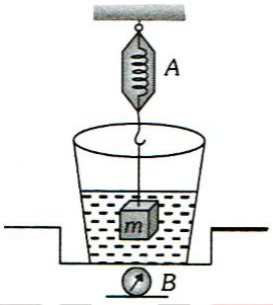
a) Acceleration of the system of masses is 88/15 ms^{-2}
b) Net force acting on 3 kg mass is greater than that on 2 kg mass
c) Tension $T_2 > T_1$
d) Since 10 kg mass is acceleration downwards, so net force acting on it should be greater than any of the two blocks shown in the figure

7. A body of mass 5 kg is suspended by the strings making angles $60°$ and $30°$ with the horizontal as shown in the figure($g = 10\ \text{ms}^{-2}$). Then



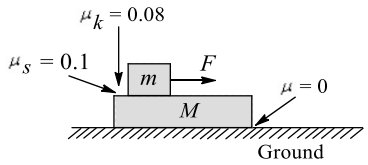
a) $T_1 = 25$ N b) $T_2 = 25$ N c) $T_1 = 25\sqrt{3}$ N d) $T_2 = 25\sqrt{3}$ N

8. The spring balance A reads 2 kg with a block m suspended from it. A balance B reads 5 kg when a beaker filled with liquid is put on the pan of the balance. The two balances are now so arranged that the hanging mass is inside the liquid as shown in figure. In this situation



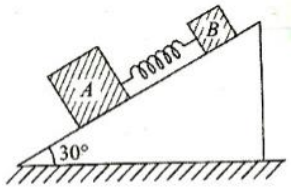
a) The balance A will read more than 2 kg
b) The balance B will read more than 5 kg
c) The balance A will read less than 2 kg and B will read more than 5 kg
d) The balances A and B will read 2 kg and 5 kg respectively

9. In the figure, if $F = 4$ N, $m = 2$ kg, $M = 4$ kg, then



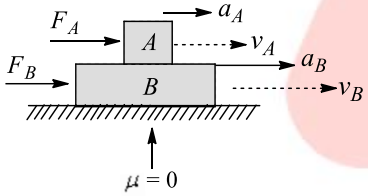
a) The acceleration of m w.r.t. ground is $\frac{2}{3}\text{ms}^{-2}$
b) The acceleration of m w.r.t. ground is $1.2\ \text{ms}^{-2}$
c) Acceleration of M is $0.4\ \text{ms}^{-2}$
d) Acceleration of M w.r.t. ground is $\frac{2}{3}\text{ms}^{-2}$

10. Two blocks A and B of masses 5 kg and 2 kg, respectively, connected by spring of force constant= $100\ \text{Nm}^{-1}$ are placed on an inclined plane of inclination $30°$ as shown in figure. If the system is released from rest



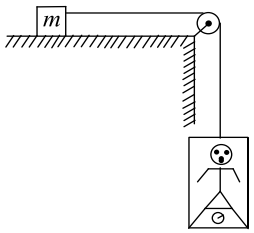
a) There will be no compression or elongation in the spring if all surfaces are smooth
b) There will be elongation in the spring if A is rough and B is smooth
c) Maximum elongation in the spring 35 cm if all surfaces are smooth
d) There will be elongation in the spring if A is smooth and B is rough

11. Two rough blocks A and B, A placed over B, move with acceleration $\vec{a}_A$ and $\vec{a}_B$,, velocities $\vec{v}_A$ and $\vec{v}_B$ by the action of horizontal forces $\vec{F}_A$ and $\vec{F}_B$, respectively. When no friction exists between the blocks A and B,



a) $v_A = v_B$
b) $a_A = v_B$
c) Both **a.** and **b.**
d) $\frac{F_A}{m_A} = \frac{F_B}{m_B}$

12. In the figure, a man of true mass M is standing on a weighing machine placed in a cabin. The cabin is joined by a string with a body of mass$m$. Assuming no friction, and negligible mass of cabin and weighing machine, the measured mass of man is (normal force between the man and the machine is proportional to the mass)



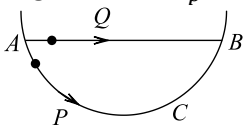
a) Measured mass of man is $\frac{Mm}{(M+m)}$

b) Acceleration of man is $\frac{mg}{(M+m)}$

c) Acceleration of man is $\frac{Mg}{(M+m)}$

d) Measured mass of man is M

13. A particle P is sliding down a frictionless hemispherical bowl. It passes the point A at $t = 0$. At this instant of time, the horizontal component of its velocity is v. A bead Q of the same mass as P is ejected from A at $t = 0$ along the horizontal string AB, with the speed v. Friction between the bead and the string may be neglected. Let t_p and t_Q be the respective times taken by P and Q to reach the point B. Then



a) $t_P < t_Q$

b) $t_P = t_Q$

c) $t_P > t_Q$

d) $\frac{t_P}{t_Q} = \frac{\text{Length of arc } ACB}{\text{Length of } AB}$

14. A ship of mass 3×10^7 kg, initially at rest, is pulled by a force of 5×104 N through a distance of 3 m. Assuming that the resistance due to water is negligible, the speed of the ship is

a) $1.5\ \text{ms}^{-1}$ b) $60\ \text{ms}^{-1}$ c) $0.1\ \text{ms}^{-1}$ d) $5\ \text{ms}^{-1}$

15. A reference frame attached to the Earth
a) In an inertial frame by definition
b) Cannot be an inertial frame because the Earth in revolving round the Sun
c) Is an inertial frame because Newton's laws are applicable in thus frame
d) Cannot be an inertial frame because the Earth is rotating about its own axis

16. Which of the following statement (s) can be explained by Newton's second law of motion?
a) To stop of heavy body (say truck), much greater force is needed than to stop a light body (say motorcycle), in the same time, if they are moving with the same speed
b) For a given body, the greater the speed, the greater the opposing force needed to stop the body in a certain time
c) To change the momentum (given), the force required is independent of time
d) The same forces acting on two different bodies for same time cause the same change in momentum in the bodies

17. A gardner waters the plants by a pipe of diameter 1 mm. The water comes out at the rate or $10\ \text{cm}^3\text{s}^{-1}$. The reactionary force exerted on the hand of the gardner is

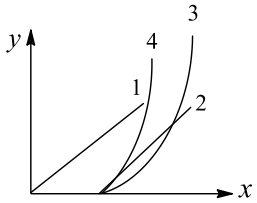
a) Zero b) 1.27×10^{-2} N c) 1.27×10^{-4} N d) 0.127 N

18. A block of mass 2 kg rests on a rough inclined plane making an angle of $30°$ with horizontal. The coefficient of static friction between the block and the plane is 0.7. The frictional force on the block is

a) 9.8 N b) $0.7 \times 9.8 \times \sqrt{3}$ N c) $9.8 \times \sqrt{3}$ N d) 0.7×9.8 N

19. A block is resting over a rough horizontal floor. At$t = 0$, a time-varying force starts acting on it, the force is

described by equation$F = kt$, where k is constnst and t is in second. Mark the correct statement (s) for this situation



a) Curve 1 shows acceleration-time graph
b) Curve 2 shows acceleration-time graph
c) Curve 3 shows velocity-time graph
d) Curve 4 shows displacement-time graph

20. A golf ball of mass 0.05 kg placed on a tee, is struck by a golf club. The speed of the gold ball as it leaves the tee is $100\ \mathrm{ms}^{-1}$, the time of contact between them is 0.02 s. If the force decreases to zero linearly with time, then the force at the beginning of the contact is

a) 5000 N
b) 250 N
c) 200 N
d) 100 N