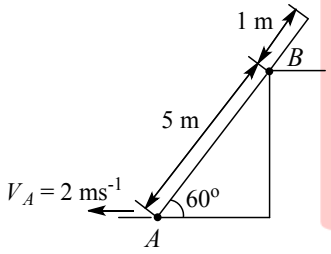
DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 3**

Topic :- LAWS OF MOTION

1. An intersteller spacecraft far away from the influence of any star or planet is moving at high speed under the influence of fusion rockets (due to thrust exerted by fusion rockets, the spacecraft is acceleration). Suddenly the engine malfunctions and stops. The spacecraft will
   a) Immediately stop, throwing all of the occupants to the front
   b) Begin slowing down and eventually come to rest
   c) Keep moving at constant speed for a while, and then begin to slow down
   d) Keep moving forever with constant speed

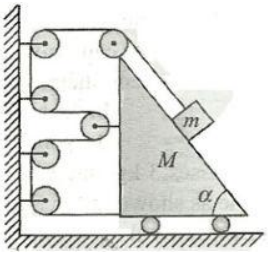
2. Velocity of point A on the rod 2 ms^{-1} (leftwards) at the instant shown in the figure. The velocity of the point B on the rod at this instant is



a) $\frac{2}{\sqrt{3}}$ ms^{-1} b) 1 ms^{-1} c) $\frac{1}{2\sqrt{3}}$ ms^{-1} d) $\frac{\sqrt{3}}{2}$ ms^{-1}

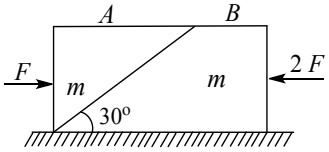
3. Two skaters have weight in the ratio 4:5 and are 9 m apart, on a smooth frictionless surface. They pull on a rope stretched between them. The ratio of the distance covered by them when they meet each other will be
   a) 5:4 b) 4:5 c) 25:16 d) 16:25

4. If the acceleration of wedge in the shown arrangement a ms^{-2} towards left, then at this instant acceleration of the block (magnitude only) would be



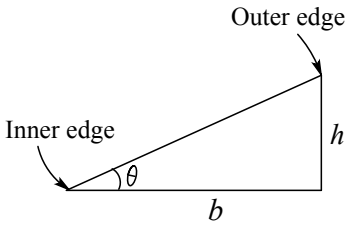
a) 4 a ms^{-2} b) $a\sqrt{17-8\cos\alpha}$ ms^{-2} c) $(\sqrt{17})a$ ms^{-2} d) $\sqrt{17}\cos\frac{\alpha}{2} \times a$ ms^{-2}

5. Two bodies A and B each of mass m are placed on a smooth horizontal surface. Two horizontal force F and 2 F are applied on the blocks A and B, respectively, as shown in the figure. The block A does not slide on block B. Then the normal reaction acting between the two blocks is (assume no friction between the blocks)



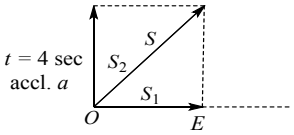
a) F b) $F/2$ c) $\frac{F}{\sqrt{3}}$ d) $3F$

6. A vehicle is moving with a velocity v on a curved road of width b and radius of curvature R. For counteracting the centripetal force on the vehicle, the difference in elevation required in between the outer and inner edges of the rod is



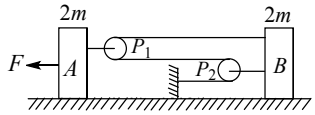
a) v^2b/Rg b) vb/Rg c) vb^2/Rg d) vb/R^2g

7. A body of mass 2 kg has an initial velocity of 3 ms^{-1} along OE and it is subjected to a force of 4 N in a direction perpendicular toOE. The distance of body from O after 4 s will be



a) 12 m b) 20 m c) 8 m d) 48 m

8. The acceleration of the block B in the following figure, assuming then surfaces and the pulleys P_1 and P_2 are all smooth is



a) $\frac{F}{4m}$ b) $\frac{3F}{13m}$ c) $\frac{F}{2m}$ d) $\frac{3F}{17m}$

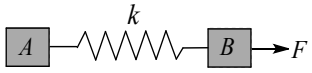
9. A lift is moving down with an acceleration a. A man in the lift drops a ball inside the lift. The acceleration of the ball as observed by the man standing stationary on the ground are, respectively,

a) a,g b) (g - a);g c) a,a d) g,g

10. A wooden box is placed on a table. The normal force on the box from the table isN_1. Now another identical box is kept on first box and the normal force on lower block due to upper block is N_2 and normal force on lower block by the table isN_3. For this situation mark out the correct statement (s)

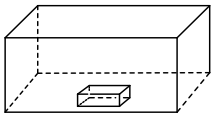
a) $N_1 = N_2 = N_3$ b) $N_1 < N_2 = N_3$ c) $N_1 = N_2 < N_3$ d) $N_1 = N_2 > N_3$

11. Two identical particles A and B, each of mass m, are interconnected by a spring of stiffness k. If the particles B experience a force F and the elongation of the spring is x, the acceleration of particles B relative to particle A is equal to



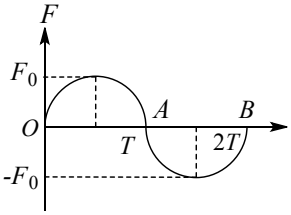
a) $\frac{F}{2m}$ b) $\frac{F - kx}{m}$ c) $\frac{F - 2kx}{m}$ d) $\frac{kx}{m}$

12. A solid block of mass 2 kg is resting inside a cube as shown in the figure. The cube is moving with a velocity $\vec{v} = 5\hat{i} + 2\hat{j}$ ms^{-1}. If the coefficient of friction between the surface of cube and block is 0.2, then the force of friction between the block and cube is



a) 10 N b) 4 N c) 14 N d) Zero

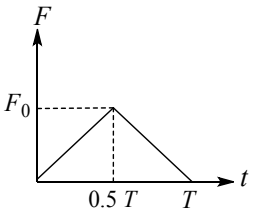
13. A unidirectional force F varying with time t as shown in the figure acts on a body initially at rest for a short duration $2T$. Then the velocity acquired by the body is



a) $\frac{\pi F_0 T}{4m}$ b) $\frac{\pi F_0 T}{2m}$ c) $\frac{F_0 T}{4m}$ d) Zero

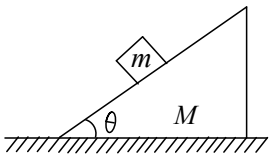
14. An object is suspended from a spring balance in a lift. The reading is 240 N when the lift is at rest. If the spring balance reading now changes to 220 N, then the lift is moving
    a) Downward with constant speed
    b) Downward with decreasing speed
    c) Downward with increasing speed
    d) Upward with increasing speed

15. A ball of mass m moving with a velocity u rebounds from a wall. The collision is assumed to be elastic and the force of interaction between the ball and wall varies as shown in the figure. Then the value of F_0 is



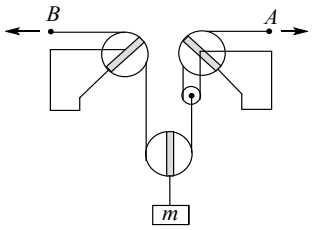
a) mu/T b) $2\ mu/T$ c) $4\ mu/T$ d) $mu/2\ T$

16. In the figure shown, the block of mass m is at rest relative to the wedge of mass $M$and the wedge is at rest with respect to ground. This implies that



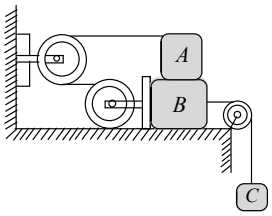
a) Net force applied by m on M is mg
b) Normal force applied by m on M is mg
c) Force of friction applied by m on M is mg
d) None of the above

17. For the pulley system shown, each of the cables at A and B is given a velocity of 2 ms^{-1} in the direction of the arrow. Determine the upward velocity v of the load m



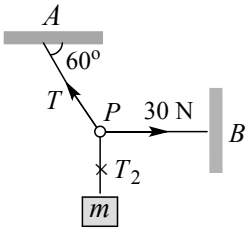
a) 1.5 ms^{-1}
b) 3 ms^{-1}
c) 6 ms^{-1}
d) 4.5 ms^{-1}

18. The maximum value of mass of block C so that neither A nor B moves is (Given that mass of A is 100 kg and that of B is 140 kg. Pulleys are smooth and friction coefficient between A and b and between B and horizontal surface is$\mu = 0.3$). take g = 10 ms^{-2}



a) 210 kg
b) 190 kg
c) 185 kg
d) 162 kg

19. Three light strings are connected at the point$P$. A weight W is suspended from one of the string. End A of string AP and end B of string PB are fixed as shown. In equilibrium, PB is horizontal and PA makes an angle of 60° with the horizontal. If the tension in PB is 30 N, then the tension in PA and weight W are, respectively, given by



a) 60 N; 30 N
b) $60/\sqrt{3};30\sqrt{3}$ N
c) 60 N;$30\sqrt{3}$ N
d) $60\sqrt{3};30\sqrt{3}$ N

20. If the resultant of all the external forces acting on a system of particles is zero, then from an inertial frame, one can surely say that
    a) Liner momentum of the system does not change in time
    b) Kinetic energy of the system does not change in time
    c) Angular momentum of the system does not change in time
    D) Potential energy of the system does not change in time