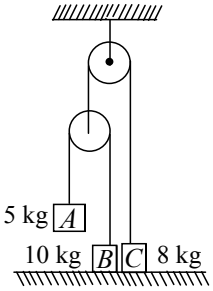
DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 8**

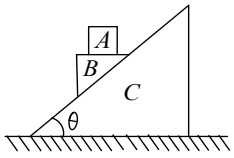
Topic :- LAWS OF MOTION

1. In the following arrangement, the system is initially at rest. The 5 kg block is now released. Assuming the pulleys and string to be massless and smooth, the acceleration of block C will be



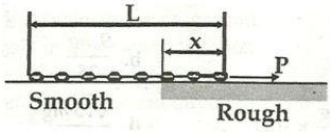
a) Zero b) 2.5 ms^{-2} c) $10/7$ ms^{-2} d) $5/7$ ms^{-2}

2. In the figure shown, all blocks are of equal mass$m$. All surfaces are smooth. The acceleration of the block A with respect ground is



a) $\frac{4g\sin\theta}{1+3\sin^2\theta}$ b) $\frac{4g\sin^2\theta}{1+3\sin^2\theta}$ c) $\frac{4g\sin^2\theta}{\sqrt{1+3\sin^2\theta}}$ d) None of these

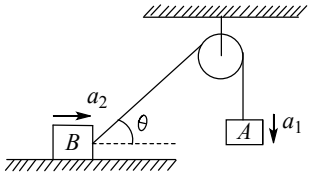
3. A chain of length L is placed on a horizontal surface as shown in the figure. At any instant x is the length of chain on rough surface and the remaining portion lies on smooth surface. Initially $x = 0$. A horizontal force P is applied to the chain (as shown in figure). In the duration x chnages from $x = 0$ to$x = L$. For chain to move with constant speed,



a) The magnitude of P should increase with time
b) The magnitude of P should decrease with time
c) The magnitude of P should increase first and then decrease with time

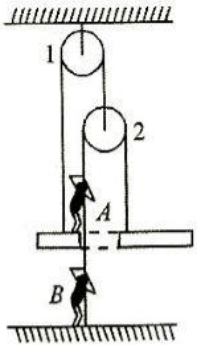
d) The magnitude of P should decrease first and then increase with time

4. Figure shows two blocks, each of mass m. The system is released from rest. If acceleration of blocks A and B at any instant (not initially) are a_1 and a_2, respectively, then



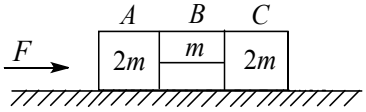
a) $a_1 = a_2 \cos\theta$ b) $a_2 = a_1 \cos\theta$ c) $a_1 = a_2$ d) None of these

5. In the given diagram, man A is standing on a movable plank while man B is standing on a stationary platform. Both are pulling the string down such that the plank moves slowly up. As a result of this the string slips through the hands of the men. Find the ratio of length of the string that slips through the hands of A and B



a) 3/2 b) 3/4 c) 4/3 d) 2/3

6. A system is pushed by a force F as shown in figure. All surfaces are smooth except between B and C. Friction coefficient between B and C is μ. Minimum value of F to prevent block B from down ward slipping is

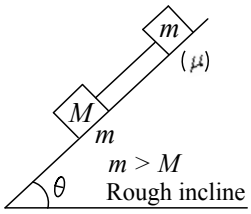


a) $\left(\frac{3}{2\mu}\right)mg$ b) $\left(\frac{5}{2\mu}\right)mg$ c) $\left(\frac{5}{2}\right)\mu mg$ d) $\left(\frac{3}{2}\right)\mu mg$

7. A body of mass m is launched up on a rough inclined plane making an angle 45° with horizontal. If the time of ascent is half of the time of descent, the friction coefficient between plane and body is

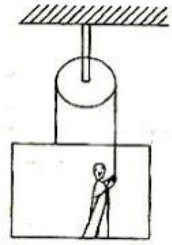
a) $\frac{2}{5}$ b) $\frac{3}{5}$ c) $\frac{3}{4}$ d) $\frac{4}{5}$

8. In figure, the tension in the rope (rope is light) is



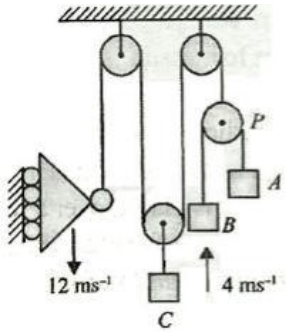
a) $(M+m)\text{g}\sin\theta$
b) $(M+m)\text{g}\sin\theta$ - $\mu\, m\text{g}\cos\theta$
c) Zero
d) $(M+m)\text{g}\cos\theta$

9. A person is drawing himself up and a trolley on which he stands with some acceleration. Mass of the person is more than the mass of the trolley. As the person increases his force on the string, the normal reaction between person and the trolley will



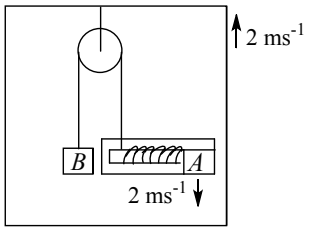
a) Increase
b) Decrease
c) Remain same
d) Cannot be predicted s data is insufficient

10. In the arrangement shown in the figure below at a particular instant the roller is coming down with a speed of 12 ms^{-1} and C is moving up with 4 ms^{-1}. At the same instant, it is also known that w.r.t pulley P, block A is moving down with speed 3 ms^{-1}. Determine the motion of block B (velocity) w.r.t. ground



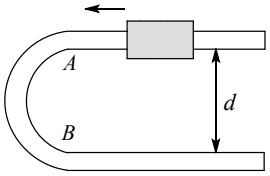
a) 4 ms^{-1} in downward direction
b) 3 ms^{-1} in upward direction
c) 7 ms^{-1} in downward direction
d) 7 ms^{-1} in upward direction

11. In the figure shown the velocity of lift is 2 ms^{-1} while string is winding on the motor shaft with velocity 2 ms^{-1} and block A is moving downwards with velocity of 2 ms^{-1}, then find out the velocity of block B



a) 2 ms^{-1} ↑ b) 2 ms^{-1} ↑ c) 4 ms^{-1} ↑ d) None of these

12. A fixed U-shaped smooth wire has a semi-circular bending between A and B as shown in figure. A bead of mass m moving with uniform speed v through the wire enters the semiconductor bend at A and leaves at B. The averages force exerted by the bead on the part AB of the wire is

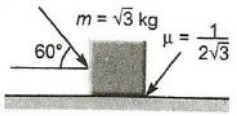


a) 0 b) $\frac{4mv^2}{\pi d}$ c) $\frac{2mv^2}{\pi d}$ d) None of these

13. A block is lying on the horizontal frictionless surface. One end of a uniform rope is fixed to the block which is pulled in the horizontal direction by applying a force F at the other end. If the mass of the rope is half the mass of the block, the tension in the middle of the rope will be

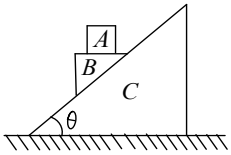
a) F b) $2F/3$ c) $3F/5$ d) $5F/6$

14. What is the maximum value of the force F such that the block shown in the arrangement, does not move?



a) 20 N b) 10 N c) 12 N d) 15 N

15. In the figure shown, all blocks are of equal mass$m$. All surfaces are smooth, the acceleration of C w.r.t. ground is

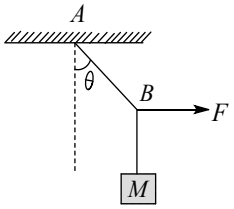


a) $\frac{2g\sin\theta\cos\theta}{1+3\sin^2\theta}$ b) $\frac{g\sin\theta\cos\theta}{1+3\sin^2\theta}$ c) $\frac{g\sin 2\theta}{\sqrt{1+3\sin^2\theta}}$ d) $\frac{g\sin\theta\cos\theta}{\sqrt{1+3\sin^2\theta}}+$

16. A box of mass 8 kg is placed on a rough inclined plane of inclinationθ. Its downwards motion can be prevented by applying an upward pull F and it can be made to slide upwards by applying an upward pull F and it can be made to slide upwards by applying a force2 F. The coefficient of friction between the box and the inclined plane is

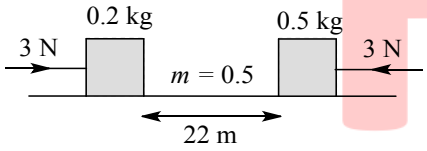
a) $(\tan\theta)/3$ b) $3\tan\theta$ c) $(\tan\theta)/2$ d) $2\tan\theta$

17. A mass M is suspended by a rope from a rigid support at A as shown in figure. Another rope is tied at the end B and it is pulled horizontally with a force$F$. If the rope AB makes an angle θ with the vertical, then the tension in the string AB is



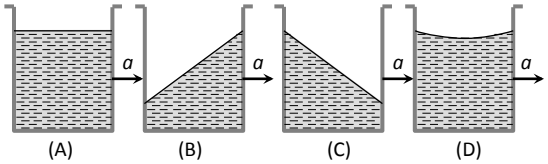
a) $F\sin\theta$ b) $F/\sin\theta$ c) $F\cos\theta$ d) $F/\cos\theta$

18. Two blocks of masses 0.2 kg and 0.5 kg, which are placed 22 m apart on a rough horizontal surface ($\mu = 0.5$), are acted upon by two forces of magnitude 3 N each as shown in figure at time $t = 0$. Then, the time t at which they collide with each other is



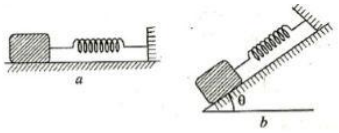
a) 1 s b) $\sqrt{2}$ s c) 2 s d) None

19. A vessel containing water is given a constant acceleration a towards the right, along a straight horizontal path. Which of the following diagram represents the surface of the liquid

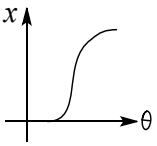


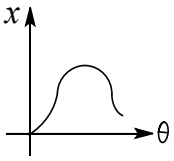
a) A b) B c) C d) D

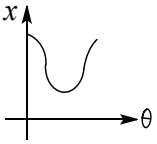
20. A block is placed on a rough horizontal plane attached with an elastic spring as shown in the figure



Initially spring is unstretched. If the plane is gradually lifted from $\theta = 0^\circ$ *to* $\theta = 90^\circ$, then the graph showing extension in the spring (x) versus angle (θ) is

a) 

b) 

c) 

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