

DPP – 1

Video Solution on Website:-

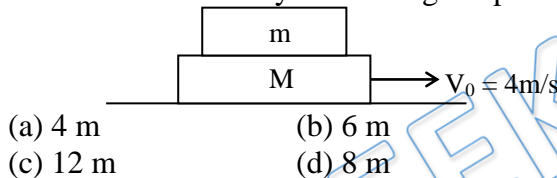
<https://physicsaholics.com/home/courseDetails/64>

Video Solution on YouTube:-

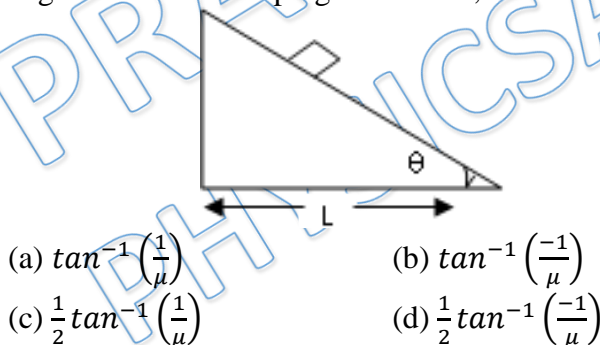
<https://youtu.be/B713k2l2ebE>

- Q 1. A body is moving down inclined plane of slope 37° . The coefficient of friction between the body and plane varies as $\mu = 0.3x$, where x is distance traveled down the plane. The body will have maximum speed at –
($\sin 37^\circ = \frac{3}{5}$ and $g = 10 \text{ m/s}^2$)
- (a) $x = 1.16 \text{ m}$ (b) $x = 2 \text{ m}$
(c) bottom of plane (d) $x = 2.5 \text{ m}$

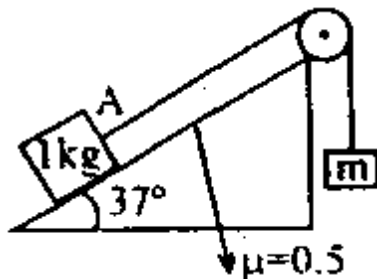
- Q 2. A stationary body of mass m is slowly lowered (zero initial velocity) onto a long massive platform of mass M ($M \gg m$) moving at a speed $V_0 = 4 \text{ m/s}$ as shown in fig. How far will the body slide along the platform? ($\mu = 0.2$ and $g = 10 \text{ m/s}^2$)



- Q 3. A small body starts sliding down an inclined plane of inclination θ , whose base length is equal to L . The coefficient of friction between the body and the surface is μ . If the angle θ is varied keeping L constant, at what angle will the time of sliding be least?



- Q 4. In the figure, what should be mass m so that block A slide up with a constant velocity?



- (a) 2 Kg (b) 1 Kg

(c) 4 Kg

(d) 2.5 Kg

Q 5. In the diagram shown in figure. Match the following table

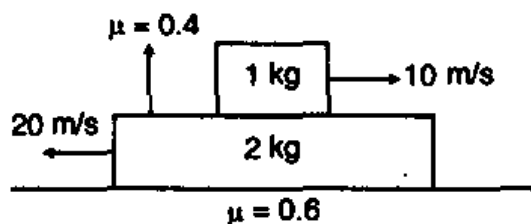
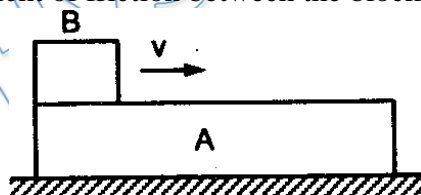


Table-1		Table-2	
(A)	Absolute acceleration of 1 kg block	(P)	11 m/s ²
(B)	Absolute acceleration of 2 kg block	(Q)	6 m/s ²
(C)	Relative acceleration between the two	(R)	17 m/s ²
		(S)	None

Q 6. A block of mass 4 kg is kept over a rough horizontal surface. The coefficient of friction between the block and the surface is 0.1. At $t = 0$, velocity $3 \text{ m/s } \hat{i}$ is imparted to the block and simultaneously force $2\text{N } (-\hat{i})$ starts acting on it. Its displacement in first 5 second is

- (a) $8\hat{i}$ (b) $-8\hat{i}$
(c) $3\hat{i}$ (d) $-3\hat{i}$

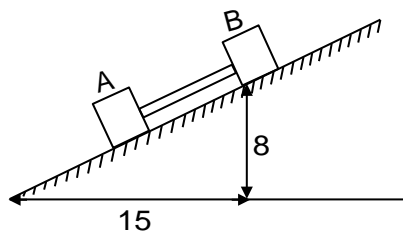
Q 7. A long block A is at rest on a smooth horizontal surface. A small block B, whose mass is half of A, is placed on A at one end and projected along A with some velocity u . The coefficient of friction between the blocks is μ .



- (a) The blocks will reach a final common velocity $u/3$
(b) Friction on A is towards right.
(c) Before the blocks reach a common velocity, the acceleration of A relative to B is $\frac{2}{3}\mu g$.
(d) Before the blocks reach a common velocity the acceleration of A relative to B is $\frac{3}{2}\mu g$.

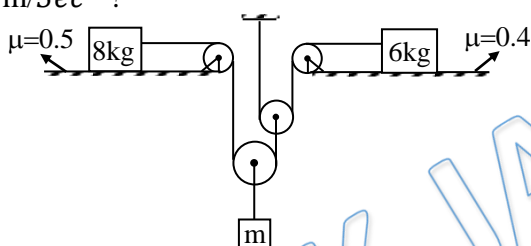
Q 8. Blocks A and B in the figure are connected by a bar of negligible weight and they are sliding down due to their weight. If mass of A and B are 170 kg each and $\mu_A = 0.2$ and

$\mu_B = 0.4$, where μ_A and μ_B are the coefficients of friction between blocks and plane, calculate the force in the bar. ($g = 10 \text{ m/s}^2$).



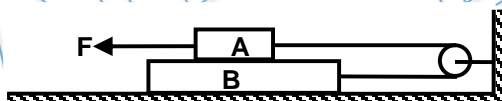
- (a) 150 N (b) 75 N
(c) 200 N (d) 250 N

Q 9. 8kg and 6kg blocks are moving towards each other. Find m if it is moving down with acceleration 1 m/Sec^2 ?



- (a) 98 Kg (b) 49 Kg
(c) 12 Kg (d) 60 Kg

Q 10. In given figure mass of A is 10 kg and that of B is 20 kg. friction coefficient at all surfaces is 0.5. Find F if acceleration of A is 2 m/Sec^2 ?



- (a) 150 N (b) 210 N (c) 260 N (d) 310 N

Answer Key

Q.1 d	Q.2 a	Q.3 d	Q.4 b	Q.5 A(S), B(P), C(S)
Q.6 c	Q.7 a, b, d	Q.8 a	Q.9 c	Q.10 d
Q.11	Q.12			