

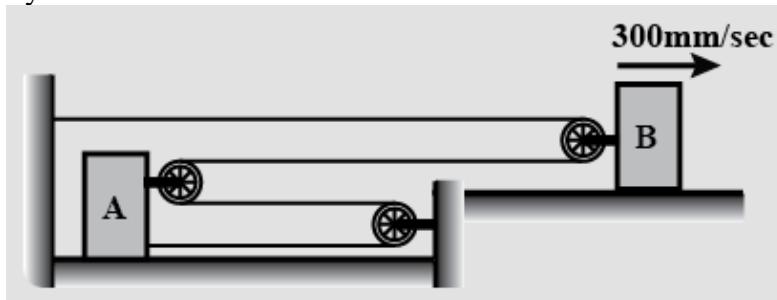
Video Solution on Website:-

<https://physicsaholics.com/home/courseDetails/42>

Video Solution on YouTube:-

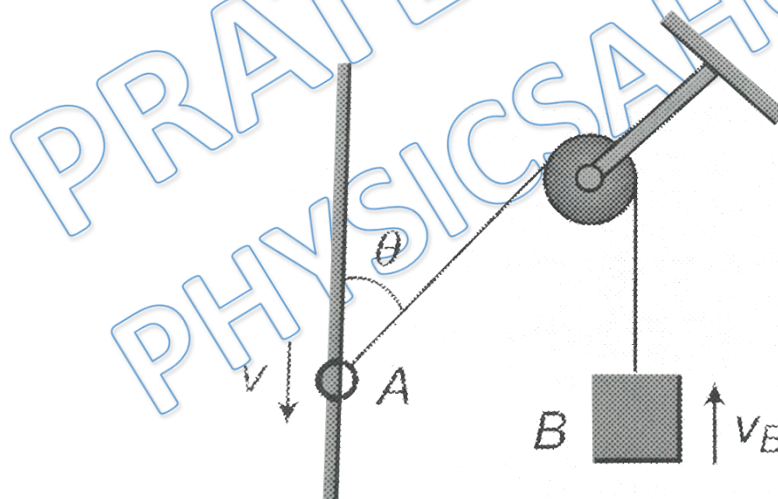
<https://youtu.be/rTg2MIwPV6g>

- Q 1. If the velocity of block B in the given arrangement is 300 mm/sec towards right. Find the velocity of A:



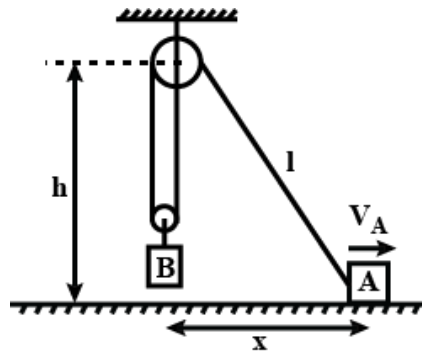
- (a) 100 mm/sec  
(b) 200 mm/sec  
(c) 300 mm/sec  
(d) 400 mm/sec

- Q 2. Find the velocity of block B when ring A is moving downward with velocity  $v$ :



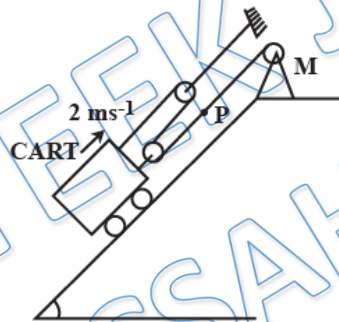
- (a)  $v \sin \theta$   
(b)  $\frac{v}{2} \sin \theta$   
(c)  $v \cos \theta$   
(d)  $\frac{v}{2} \cos \theta$

- Q 3. If block A is moving horizontally with velocity  $V_A$ , then find the velocity of block B at the instant as shown in fig.:



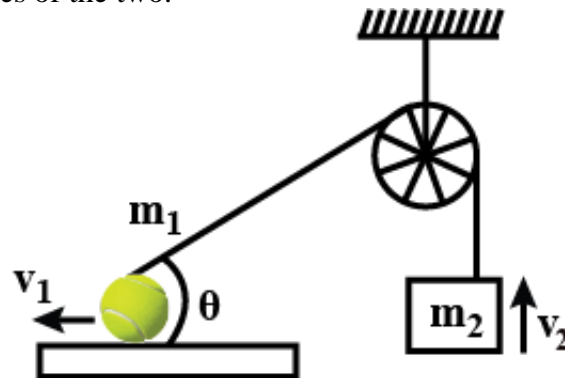
- (a)  $\frac{hV_A}{2\sqrt{x^2+h^2}}$  (b)  $\frac{xV_A}{\sqrt{x^2+h^2}}$   
 (c)  $\frac{xV_A}{2\sqrt{x^2+h^2}}$  (d)  $\frac{hV_A}{\sqrt{x^2+h^2}}$

- Q 4. A cart is being pulled up the incline, using a motor  $M$  and an ideal pulley and ideal rope arrangement as shown in figure. Then the speed of point ' $P$ ' of the string with which it moves so that the car moves up the inclined plane with a constant speed of  $V_{cart} = 2 \text{ m/s}$  is (Incline is at rest):



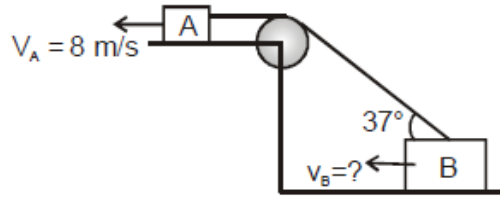
- (a)  $12 \text{ m/s}$  (b)  $3 \text{ m/s}$   
 (c)  $5 \text{ m/s}$  (d)  $6 \text{ m/s}$

- Q 5. In Fig. a ball of mass  $m_1$  and a block of mass  $m_2$  are joined together with an inextensible string. The ball can slide on a smooth horizontal surface. If  $V_1$  and  $V_2$  are the respective speeds of the ball and the block, then determine the constraint relation between velocities of the two.



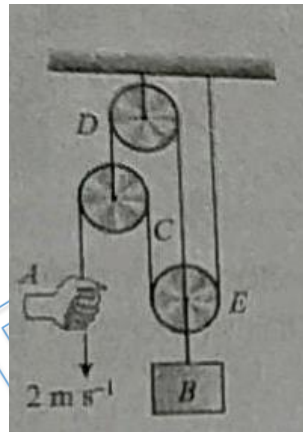
- (a)  $V_2 = V_1 \cos \theta$  (b)  $V_1 = V_2 \cos \theta$   
 (c)  $V_1 = V_2$  (d)  $V_2 = V_1 \sin \theta$

Q 6. Find  $V_B = ?$



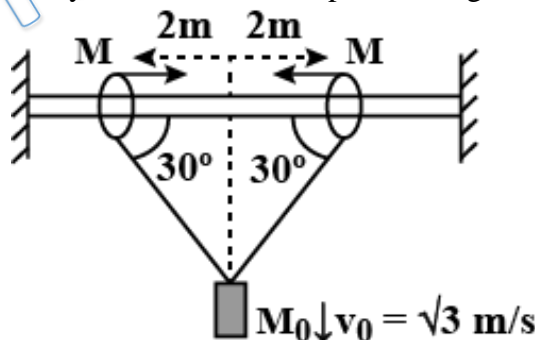
- (a) 10 m/s (b) 8 m/s  
(c) 14 m/s (d) 6 m/s

Q 7. Determine the speed with which block B rises in Fig. if the end of the cord at A is pulled down with a speed of 2 m/s.



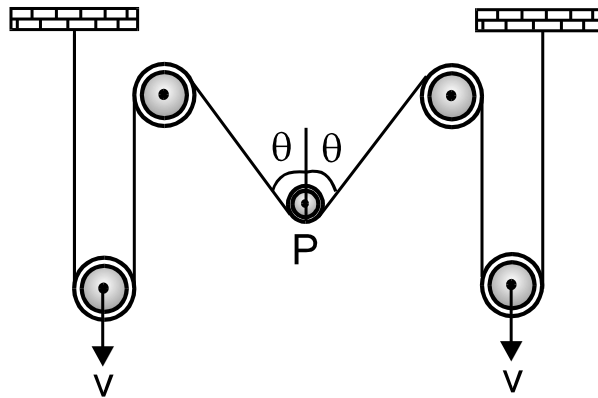
- (a) 4 m/s (b) 3 m/s  
(c)  $\frac{3}{2}$  m/s (d)  $\frac{1}{2}$  m/s

Q 8. Two rings each of mass  $M = 100 \text{ gm}$  are constrained to move along a fixed horizontal rod. An ideal string is connected with rings and block of mass  $M_0 = 200 \text{ gm}$  is connected to the mid point of string. At a certain moment the mass  $m$  is moving downward with velocity  $\sqrt{3} \text{ m/s}$ . Find the speed of ring of  $M$  at the moment:



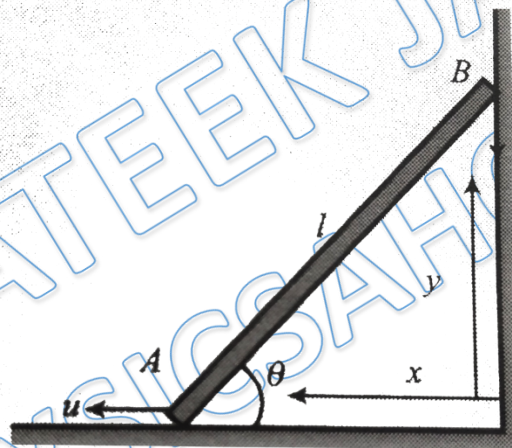
- (a) 4 m/s (b) 3 m/s  
(c) 2 m/s (d) 1 m/s

Q 9. In the given figure, find the speed of pulley P –



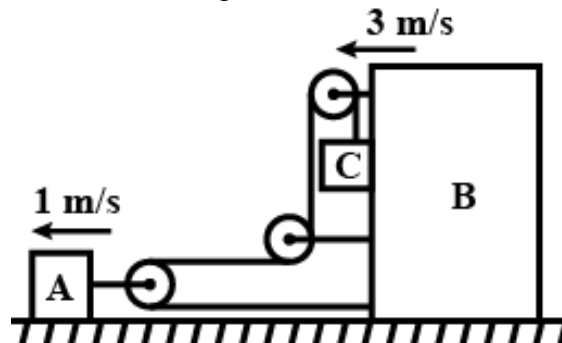
- (a)  $\frac{V}{2}$  (b)  $2V \cos \theta$   
 (c)  $\frac{2V}{\cos \theta}$  (d)  $\frac{V}{2 \sin \theta}$

Q 10. Figure shows a rod of length  $l$  resting on a wall and the floor. Its lower end A is pulled towards left with a constant velocity  $u$ . As a result of this, end A starts moving down along the wall. Find the velocity of the other end B downward when the rod makes an angle  $\theta$  with the horizontal:



- (a)  $u \tan \theta$  (b)  $u \cot \theta$   
 (c)  $u \sin \theta$  (d)  $u \cos \theta$

Q 11. The velocities of A and B are marked in the figure. Find the velocity of block C (assume that the pulleys are ideal and string inextensible)



- (a) 2 m/s (b) 4 m/s  
 (c) 5 m/s (d)  $\sqrt{10}$  m/s



## **Answer Key**

<b>Q.1 b</b>	<b>Q.2 c</b>	<b>Q.3 c</b>	<b>Q.4 d</b>	<b>Q.5 a</b>
<b>Q.6 a</b>	<b>Q.7 d</b>	<b>Q.8 d</b>	<b>Q.9 c</b>	<b>Q.10 b</b>
<b>Q.11 c</b>				