Physicsaholics

DPP – 2 (NLM)

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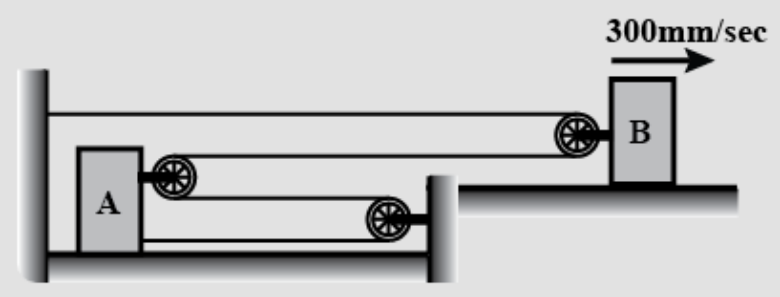
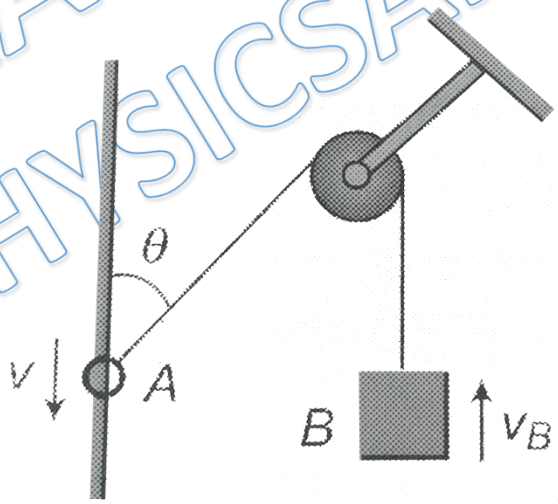
Q 1. If the velocity of block B in the given arrangement is 300 mm/sec towards right. Find the velocity of A:



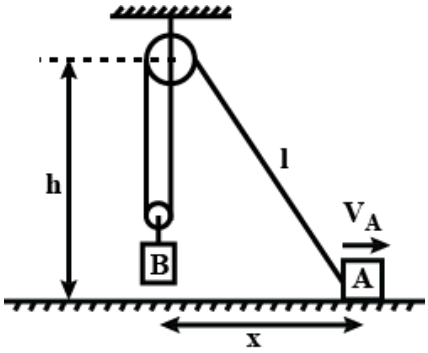
(a) 100 mm/sec (b) 200 mm/sec
(c) 300 mm/sec (d) 400 mm/sec

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



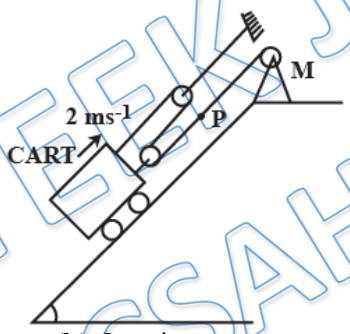
(a) $v \sin\theta$ (b) $\frac{v}{2}\sin\theta$
(c) $v \cos\theta$ (d) $\frac{v}{2}\cos\theta$

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:.



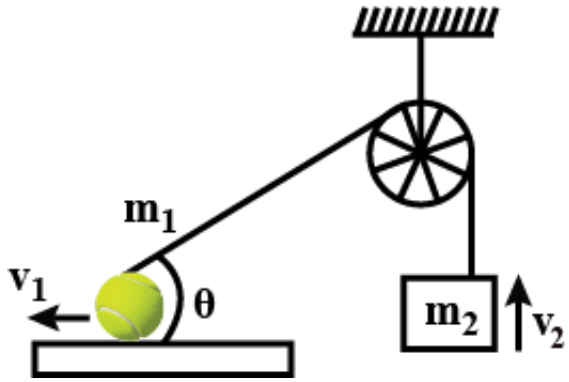
(a) $\frac{hV_A}{2\sqrt{x^2+h^2}}$ (b) $\frac{xV_A}{\sqrt{x^2+h^2}}$
(c) $\frac{xV_A}{2\sqrt{x^2+h^2}}$ (d) $\frac{hV_A}{\sqrt{x^2+h^2}}$

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 $V_{cart} = 2\ m/s$ is (Incline is at rest):



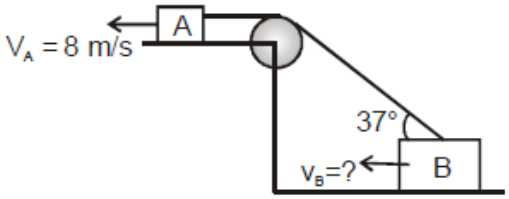
(a) $12\ m/s$ (b) $3\ m/s$
(c) $5\ m/s$ (d) $6\ m/s$

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.



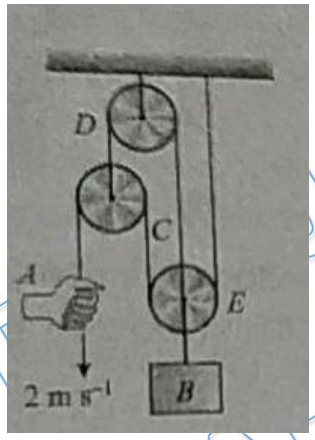
(a) $V_2 = V_1 \cos\theta$ (b) $V_1 = V_2 \cos\theta$
(c) $V_1 = V_2$ (d) $V_2 = V_1 \sin\theta$

Q 6. Find V_B =?



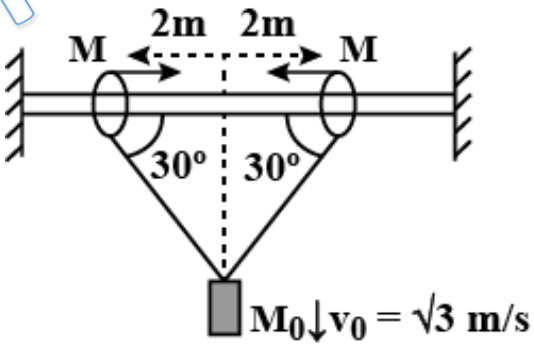
(a) 10 m/s (b) 8 m/s
(c) 14 m/s (d) 6 m/s

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.



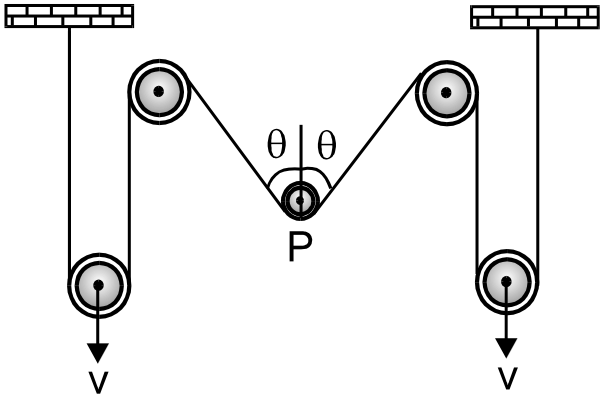
(a) 4 m/s (b) 3 m/s
(c) $\frac{3}{2}$ m/s (d) $\frac{1}{2}$ m/s

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

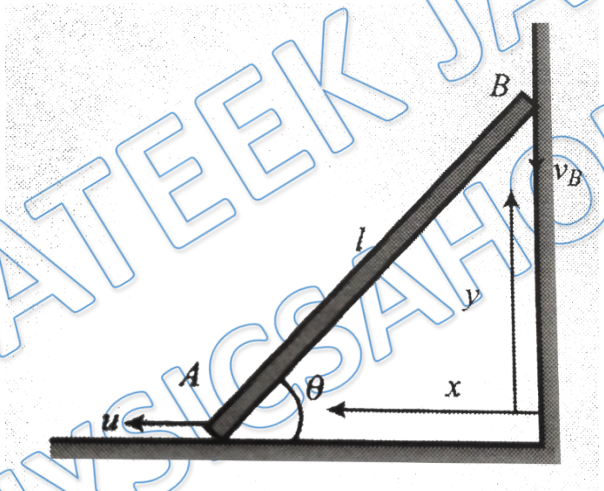
Q 9. In the given figure, find the speed of pulley P –



(a) $\frac{V}{2}$ (b) $2V\cos\theta$

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

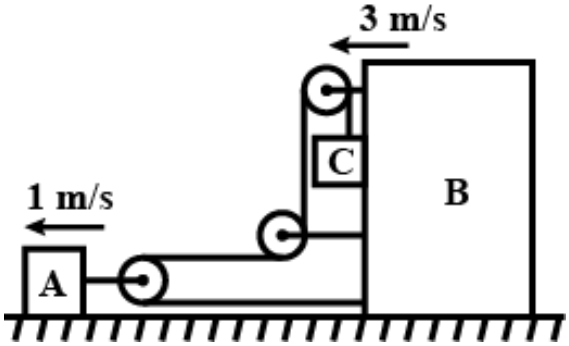
Q 10. Figure shows a rod of length l resting on a wall and the floor. Its lower end A is pulled towards left with a constant velocity u. As a result of this, end A starts moving down along the wall. Find the velocity of the other end B downward when the rod makes an angle θ with the horizontal:



(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

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