

Video Solution on Website:-

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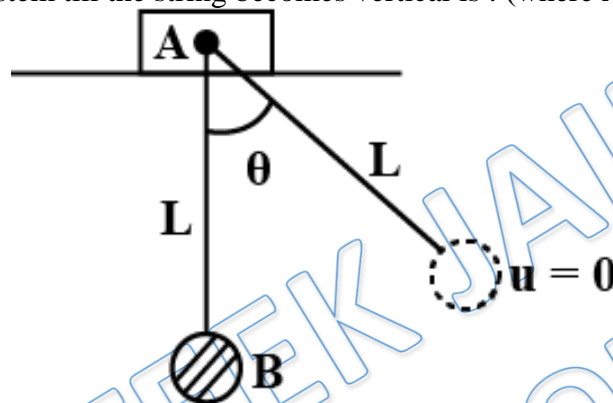
Video Solution on YouTube:-

https://youtu.be/c0r3w_sNa2s

Written Solution on Website:-

<https://physicsaholics.com/note/notesDetails/49>

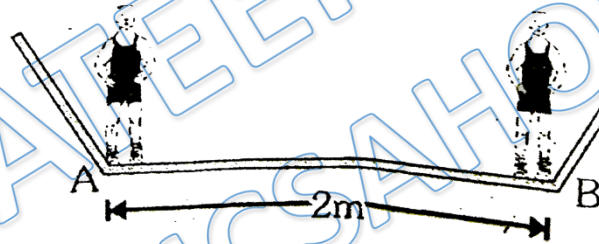
- Q 1. The magnitude of vertical displacement of center of mass of A+B (A & B having same mass) system till the string becomes vertical is : (where A is fixed)



- (a) zero (b) $\frac{L}{2}(1 - \cos \theta)$
 (c) $\frac{L}{2}(1 - \sin \theta)$ (d) none of these
- Q 2. In a gravity free space, a man of mass M standing at a height h above the floor, throws a ball of mass m straight down with a speed u. When the ball reaches the floor, the distance of the man above the floor will be
 (a) $h \left(1 + \frac{m}{M}\right)$ (b) $h \left(2 - \frac{m}{M}\right)$
 (c) 2h (d) a function of m, M, h and u
- Q 3. A man of 50kg mass is standing in a gravity free space at a height of 10m above the floor. He throws a stone of 0.5kg mass downwards with a speed 2m/s. When the stone reaches the floor, the distance of the man above the floor will be
 (a) 9.9 m (b) 10.1 m
 (c) 1.0 m (d) 20 m
- Q 4. Consider a two particle system with particles having masses m_1 and m_2 . If the first particle is pushed towards the center of mass through a distance d, by what distance should the second particle be moved, so as to keep the center of mass at the same position –
 (a) $\frac{m_1}{m_2} d$ (b) d
 (c) $\frac{m_2}{m_1} d$ (d) $\frac{m_1}{m_1+m_2} d$



- Q 5. Two blocks of masses 10 kg and 20 kg are placed on the X-axis. The first mass (10 kg) is moved on the axis by a distance of 2 cm. By what distance should the second mass be moved to keep the position of the center of mass unchanged?
- (a) 1 cm (b) 2 cm
(c) 3 cm (d) 4 cm
- Q 6. Two blocks of masses 10 kg and 30 kg are placed along a vertical line. The first block (10 kg) is raised through a height of 7 cm. By what distance should the second mass be moved to raise the center of mass by 1 cm?
- (a) 1 cm (b) 6 cm
(c) 7 cm (d) 8 cm
- Q 7. A boy is standing at the center of a boat which is free to move on water. If the masses of the boy and the boat are M and m respectively and the boy moves a distance of 1 m forward then the movement of the boat is meters
- (a) $\frac{Mm}{M+m}$ (b) $\frac{m}{M+m}$
(c) $\frac{M}{M+m}$ (d) $\frac{m}{M-m}$
- Q 8. Two persons A and B of weight 80kg and 50kg respectively are standing at opposite ends of a boat of mass 70kg and length 2m at rest. When they interchange their positions then displacement of the center of mass of the boat will be :-



- (a) 60cm towards left
(b) 30cm towards right
(c) 30cm towards left
(d) remains stationary
- Q 9. A man weighing 80 kg is standing at the center of a flat boat and he is 20 m from the shore. He walks 8 m on the boat towards the shore and then halts. The boat weight 200 kg. How far is he from the shore at the end of this time ?
- (a) 11.2 m (b) 13.8 m
(c) 14.3 m (d) 15.4 m
- Q 10. A man of 80 kg attempts to jump from the small boat of mass 40 kg on to the shore. He can generate a relative velocity of 6 m/s between him and boat. His velocity towards shore is
- (a) 2 m/s (b) 3 m/s
(c) 4 m/s (d) 5 m/s



- Q 11. A boy of mass 50kg is standing at one end of a boat of length 9m and mass 400kg. He runs to the other end. The distance through which the center of mass of the boat boy system moves is
(a) 0 m (b) 1 m
(c) 2 m (d) 3 m
- Q 12. A 1kg block slides down an inclined plane of mass 3.2kg having inclination 45° . If the inclined plane is fixed and the 1kg block slides without friction, find the acceleration of the center of mass of the system of the block and inclined plane (take $g = 9.8 \text{ m/s}^2$)
(a) 2.1 m/s^2 (b) 0.9 m/s^2
(c) 9.8 m/s^2 (d) 1.7 m/s^2
- Q 13. A boy of mass 40 kg jumps off a boat with a velocity of 3 m/s w.r.t. ground. With what momentum does the boat move ?
(a) -210 kg-m/s (b) -120 kg-m/s
(c) -125 kg-m/s (d) -215 kg-m/s
- Q 14. A bullet is fired from a gun with a velocity 600 m/s. The recoil velocity of the gun is 3 m/s. What is the ratio of the mass of the gun and bullet ?
(a) 100 : 1 (b) 400 : 1
(c) 200 : 1 (d) 300 : 2

Answer Key

Q.1 b	Q.2 a	Q.3 b	Q.4 a	Q.5 a
Q.6 a	Q.7 c	Q.8 c	Q.9 c	Q.10 a
Q.11 a	Q.12 d	Q.13 b	Q.14 c	