Physicsaholics

DPP – 4 (NLM)

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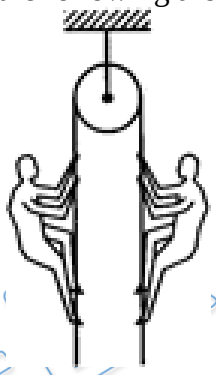
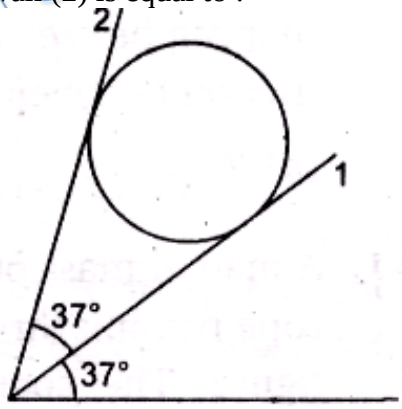
Q 1. Two men of unequal masses hold on to the two sections of a light rope passing over a smooth light pulley. Which of the following are possible?



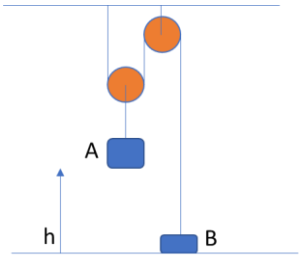
(a) The lighter man is stationary while the heavier man moves down with some acceleration
(b) The heavier man is stationary while the lighter man moves up with some acceleration
(c) The two men move with the same acceleration in the same direction.
(d) The two men move with accelerations of the same magnitude in opposite directions.

Q 2. A sphere of mass *m* is held between two smooth inclined walls. For sin 37° = 3/5, the normal reaction of the wall (2) is equal to :



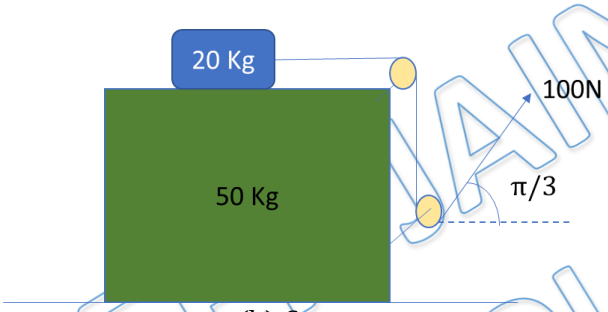
(a) mg
(b) mg sin 74°
(c) mg cos 74°
(d) none of the above

Q 3. In the arrangement mass of A is 4 times that of B . After setting free block A hits the ground and do not rebound. Find maximum height gained by B ?



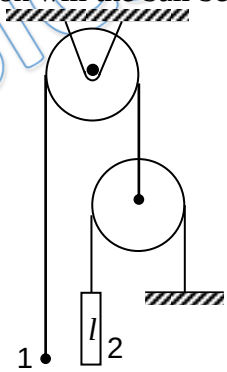
(a) h
(b) 2h
(c) 3h
(d) 4h

(a) A 20 Kg block is placed on 50 Kg wedge as shown in figure. All surfaces are smooth. Pulleys and string are massless . Find relative acceleration of block and wedge in m/Sec^2 ?



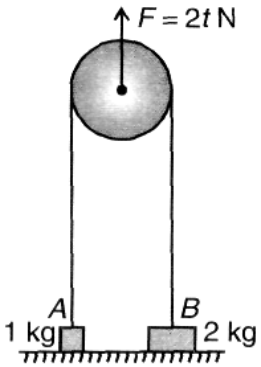
(a) 5
(b) 6
(c) 4
(d) 3

Q 5. In the arrangement shown in the figure, the mass of ball 1 is η = 1.8 times as great as rod 2. The length of the latter is l = 100 cm. The mass of the pulley and the threads, as well as the friction, is negligible. The ball is set on the same level as the lower end of rod and then released. How soon will the ball be opposite the upper end of the rod?



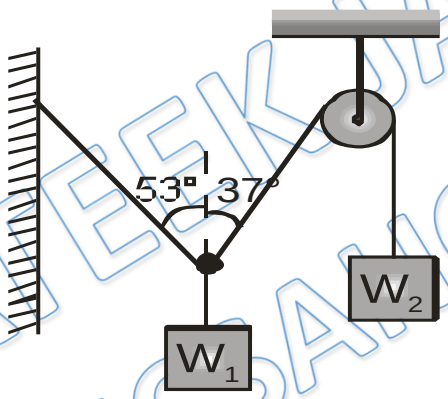
(a) 1 sec
(b) 2 sec
(c) 1.4 sec
(d) 2.4 sec

Q 6. Two blocks A and B of masses 1 kg and 2 kg respectively are placed on a smooth horizontal surface. They are connected by a massless inextensible string going over a pulley as shown. The pulley is being acted upon by a vertical force of magnitude varying with time as F= 2tN. Find acceleration of pulley at t = 30 sec



(a) 10 m/Sec^2
(b) 15 m/Sec^2
(c) 12.5 m/Sec^2
(d) 20 m/Sec^2

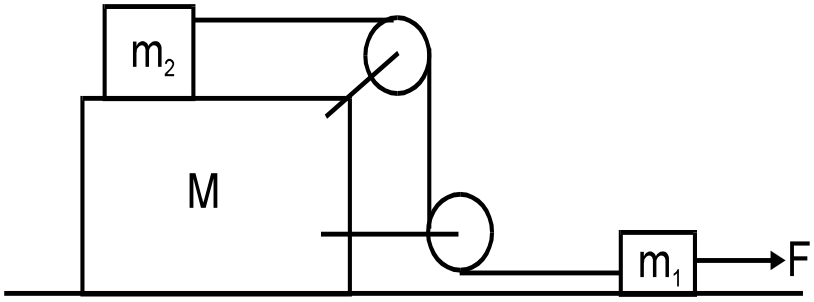
Q 7. Two weights W_1 & W_2 in equilibrium and at rest, are suspended as shown in figure. Then the ratio $\frac{W_1}{W_2}$ is :



(a) 5/4 (b) 4/5
(c) 8/5 (d) none of these

Q 8. **Match the following:**

Three blocks of masses m_1, m_2 and M are arranged as shown in figure. All the surfaces are frictionless and string is inextensible. A constant force F is applied on block of mass m_1. Pulleys and string are light. Part of the string connecting both pulleys is vertical and part of the strings connecting pulleys with masses m_1 and m_2 are horizontal.

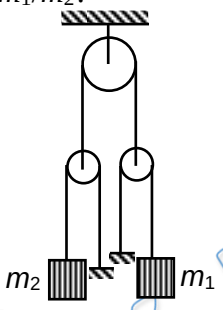


(P) Acceleration of mass m_1 (1) $\frac{F}{m_1}$

(Q) Acceleration of mass m_2 (2) $\frac{F}{m_1+m_2}$
(R) Acceleration of mass M (3) zero
(S) Tension in the string (4) $\frac{m_2F}{m_1+m_2}$

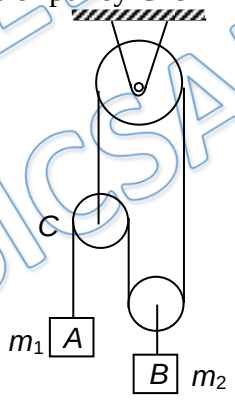
(A) P-1, Q-1, R-1,S-3 (B) P-2, Q-2, R-3,S-4
(C) P-2, Q-4, R-3,S-1 (D) P-2, Q-2, R-3,S-3

Q 9. In the given figure, all strings and pulleys are ideal and acceleration of m_1 is g/3 upward. Then find the ratio of m_1/m_2?



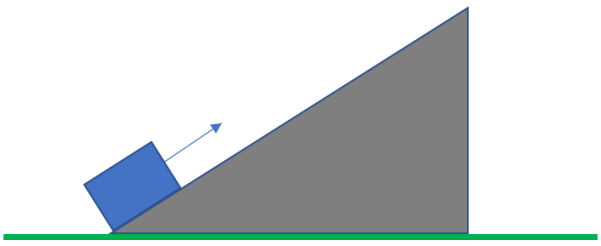
(a) 1/3 (b) 1
(c) 1/2 (d) ¼

Q 10. In the arrangement shown in the figure neglect the masses of the pulley and string and also friction. The accelerations of pulley C is



(a) g (b) 2g
(c) 3g (d) 4g

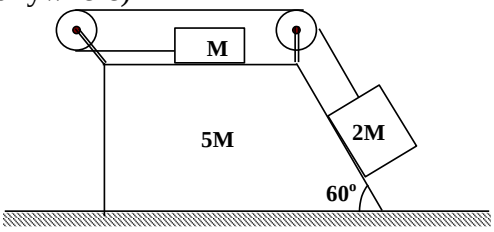
Q 11. A block is projected on a wedge as shown in figure. If friction is absent everywhere, path of block is



(a) Straight line
(b) circle

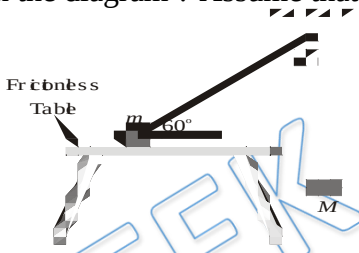
(c) parabola
(d) N.O.T.

Q 12. In the system shown, the acceleration of the wedge of mass 5M is (there is no friction anywhere)



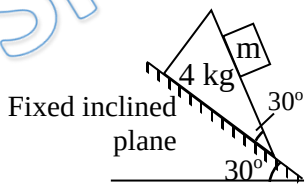
(a) 0 (b) g/2
(c) g/3 (d) g/4

Q 13. What is the minimum value of the mass *M* so that the block is lifted off the table at the instant shown in the diagram ? Assume that the blocks are initially at rest.



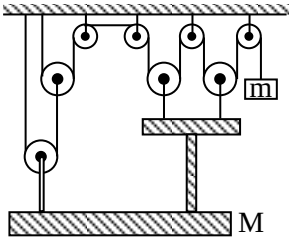
(a) $\frac{m}{\sin 60^o}$ (b) $\frac{m}{\tan 60^o}$
(c) m sin 60^o (d) none of these

Q 14. For what value of m the wedge will remain in equilibrium? Friction is absent everywhere.



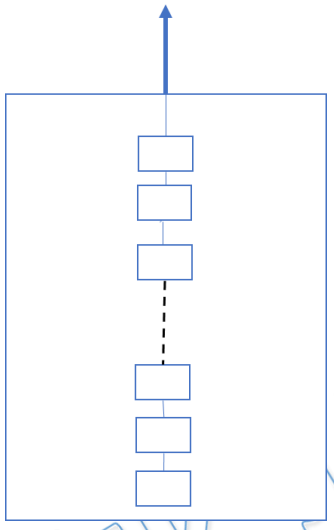
(a) 2Kg (b) 4 Kg
(c) 8Kg (d) none of these

Q 15. Find M/m so that both blocks remains unaccelerated



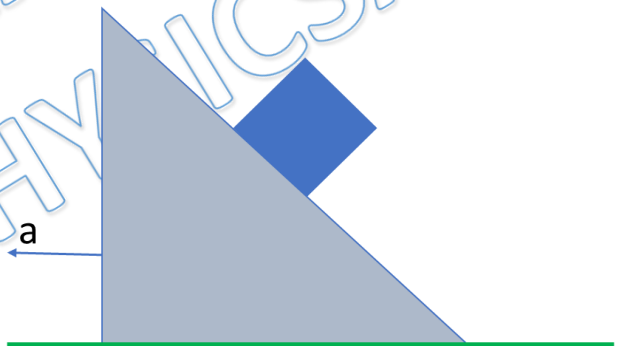
(a) 2 (b) 4
(c) 6 (d) 8

Q 16. 100 blocks are hanging in a lift of mass 950 kg as shown in figure tension in cable of lift is 9000g. From lowermost to uppermost each block has mass 1 kg greater than previous one. Mass of lowermost block is 1 kg. find net force on block of mass 50 kg ?



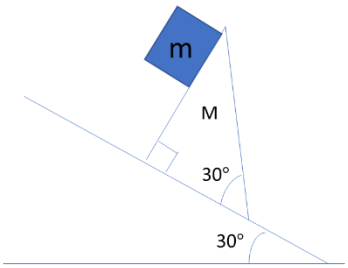
(a) 10g (b) 25g
(c) 50g (d) 100g

Q 17. A block is released on inclined surface of prism of equal mass. Angle of inclination is $\pi/4$. after releasing if prism moves with acceleration "a" find acceleration of block? All surfaces are smooth.



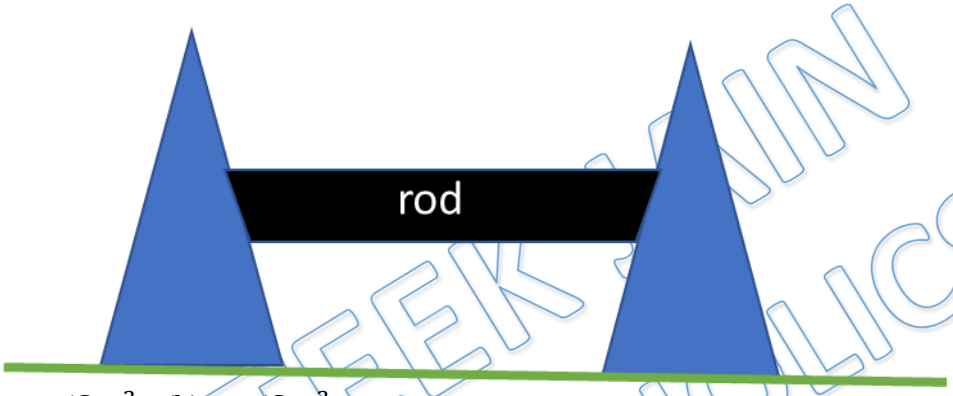
(a) a (b) $2a\sqrt{2}$
(c) $a\sqrt{5}$ (d) $a/\sqrt{2}$

Q 18. In given figure all surfaces are smooth and incline is fixed. Prism is right angled.
M = 5 kg , m = 1 kg.



(a) g/2 (b) g/5
(c) g/6 (d) g

Q 19. A rod is placed on two equilateral prisms as shown in figure. All surfaces are smooth and all objects have equal mass .find acceleration of rod after releasing system? Rod always remains horizontal during motion.(g = 10 m/Sec^2)



(a) 2 m/Sec^2 (b) 4 m/Sec^2
(c) 6 m/Sec^2 (d) 8 m/Sec^2

Answer Key

Q.1 a,b,c	**Q.2 a**	**Q.3 c**	**Q.4 b**	**Q.5 c**
Q.6 c	**Q.7 a**	**Q.8 b**	**Q.9**	**Q.10 c**
Q.11 c	**Q.12 a**	**Q.13 d**	**Q.14 c**	**Q.15 d**
Q.16 b	**Q.17 c**	**Q.18 d**	**Q.19 c**	