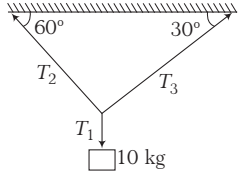
1. Four forces act on a point object. The object will be in equilibrium, if
(a) they are opposite to each other in pairs
(b) sum of x, y and z-components of forces is zero
(c) they can be represented by a closed figure of direction and magnitude.
(d) All of the above

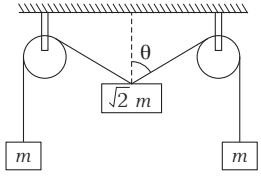
2. A block of mass 10 kg is suspended by three str shown in the figure. The tension T_2 is



(a) 100 N (b) $\frac{100}{\sqrt{3}}$ N (c) $\sqrt{3} \times 100$ N (d) $50\sqrt{3}$ N

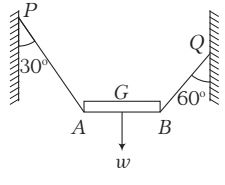
3. An object is resting at the bottom of two strings which are inclined at an angle of 120° with each other. Each string can withstand a tension of 20 N. The maximum weight of the object that can be sustained without breaking the strings is
(a) 10 N (b) 20 N (c) $20\sqrt{2}$ N (d) 40 N

4. The pulleys and strings shown in the figure are smooth and of negligible mass. For the system to remain in equilibrium, the angle θ should be



(a) 0° (b) 30° (c) 45° (d) 60°

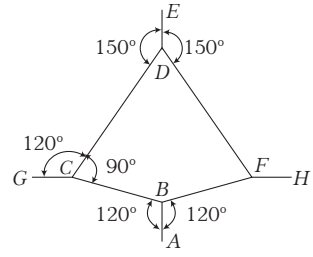
5. A non-uniform rod AB of weight w is supported horizontally in a vertical plane by two light strings PA and QB as shown in the figure. G is the centre of gravity of the rod. If PA and QB make angles 30° and 60° respectively with the vertical, the ratio $\frac{AG}{BG}$ is



(a) $\frac{1}{2}$ (b) $\sqrt{3}$ (c) $\frac{1}{3}$ (d) $\frac{1}{\sqrt{3}}$

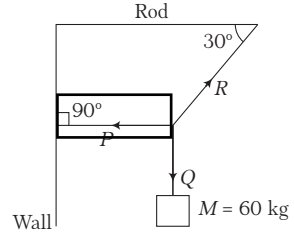
6. A weight w is suspended from the mid-point of a rope, whose ends are at the same level. In order to make the rope perfectly horizontal, the force applied to each of its ends must be
(a) less than w (b) equal to w
(c) equal to $2w$ (d) infinitely large

7. The below figure is the part of a horizontally stretched net. Section AB is stretched with a force of 10 N. The tensions in the sections BC and BF are



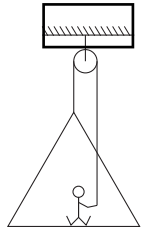
(a) 10 N, 11 N (b) 10 N, 6 N
(c) 10 N, 10 N
(d) Cannot be calculated due to insufficient data

8. A body of mass 60 kg suspended by means of three strings, P, Q and R as shown in the figure is in equilibrium. The tension in the string P is



(a) 130.9 kgf (b) 60 kgf
(c) 50 kgf (d) 103.9 kgf

9. A man of mass 50 g stands on a frame of mass 30 g. He pulls on a light rope which passes over a pulley. The other end of the rope is attached to the frame. For the system to be in equilibrium, what force man must exert on the rope?



(a) 40 g (b) 80 g
(c) 30 g (d) 50 g

10. Two particles of equal mass are connected to a rope AB of negligible mass, such that one is at end A and the other dividing the length of the rope in the ratio 1 : 2 from A. The rope is rotated about end B in a horizontal plane. Ratio of the tensions in the smaller part to the other is (ignore effect of gravity)
(a) 4 : 3 (b) 1 : 4 (c) 1 : 2 (d) 1 : 3

11. A body is under the action of two mutually perpendicular forces of 3 N and 4 N. The resultant force acting on the body is
(a) 7 N (b) 1 N
(c) 5 N (d) zero

12. Two equals forces are acting at a point with an angle of 60° between them. If the resultant force is equal to $40\sqrt{3}$ N, the magnitude of each force is
(a) 40 N (b) 20 N
(c) 80 N (d) 30 N