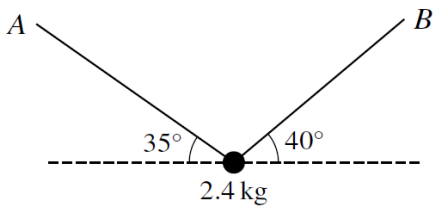
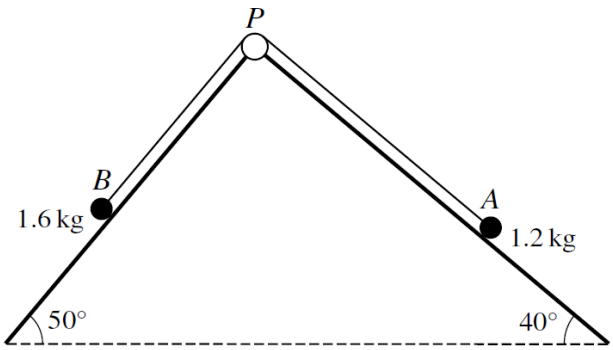
1. Nov/2023/Paper_9709/41/No.2



A particle of mass 2.4 kg is held in equilibrium by two light inextensible strings, one of which is attached to point A and the other attached to point B. The strings make angles of 35° and 40° with the horizontal (see diagram).

Find the tension in each of the two strings. [5]

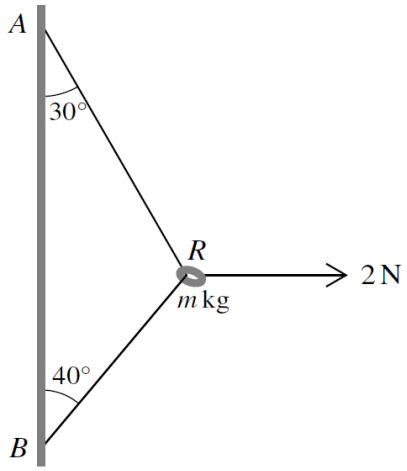
2. Nov/2023/Paper_9709/41/No.5



The diagram shows a particle A, of mass 1.2 kg, which lies on a plane inclined at an angle of 40° to the horizontal and a particle B, of mass 1.6 kg, which lies on a plane inclined at an angle of 50° to the horizontal. The particles are connected by a light inextensible string which passes over a small smooth pulley P fixed at the top of the planes. The parts AP and BP of the string are taut and parallel to lines of greatest slope of the respective planes. The two planes are rough, with the same coefficient of friction, μ, between the particles and the planes.

Find the value of μ for which the system is in limiting equilibrium. [7]

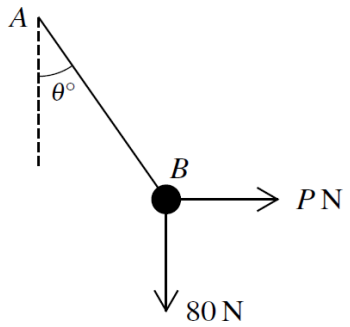
3. Nov/2023/Paper_9709/42/No.2



The diagram shows a smooth ring R, of mass m kg, threaded on a light inextensible string. A horizontal force of magnitude 2 N acts on R. The ends of the string are attached to fixed points A and B on a vertical wall. The part AR of the string makes an angle of 30° with the vertical, the part BR makes an angle of 40° with the vertical and the string is taut. The ring is in equilibrium.

Find the tension in the string and find the value of m. [5]

4. Nov/2023/Paper_9709/43/No.5



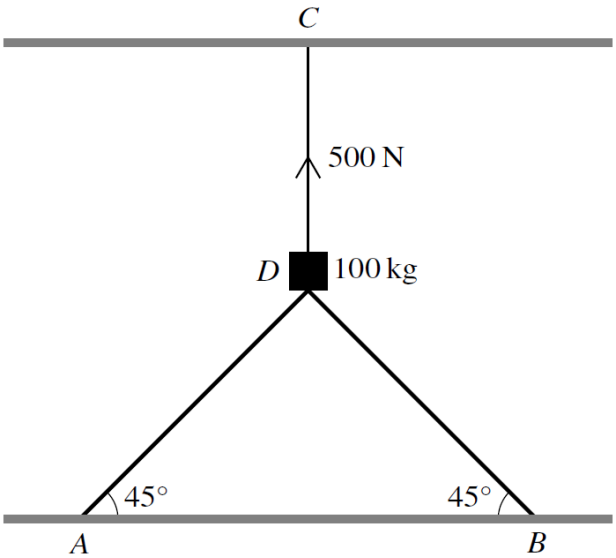
A light string AB is fixed at A and has a particle of weight 80 N attached at B. A horizontal force of magnitude P N is applied at B such that the string makes an angle $\theta°$ to the vertical (see diagram).

(a) It is given that $P = 32$ and the system is in equilibrium.

Find the tension in the string and the value of θ. [4]

(b) It is given instead that the tension in the string is 120 N and that the particle attached at B still has weight 80 N.

Find the value of P and the value of θ. [4]



The diagram shows a block D of mass 100 kg supported by two sloping struts AD and BD, each attached at an angle of 45° to fixed points A and B respectively on a horizontal floor. The block is also held in place by a vertical rope CD attached to a fixed point C on a horizontal ceiling. The tension in the rope CD is 500 N and the block rests in equilibrium.

(a) Find the magnitude of the force in each of the struts AD and BD. [3]

A horizontal force of magnitude F N is applied to the block in a direction parallel to AB.

(b) Find the value of F for which the magnitude of the force in the strut AD is zero. [3]