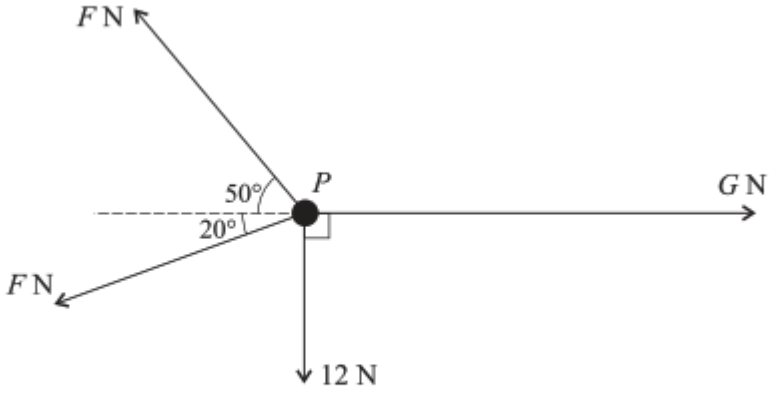
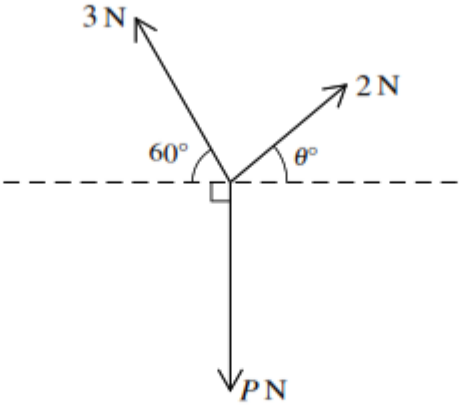
Equilibrium

M/J/2006/Q3

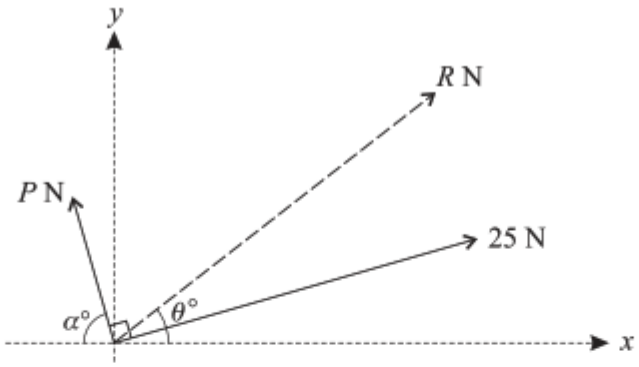


A particle P is in equilibrium on a smooth horizontal table under the action of horizontal forces of magnitudes F N, F N, G N and 12 N acting in the directions shown. Find the values of F and G. [6]

M/J/2018/Q3



The three coplanar forces shown in the diagram have magnitudes 3 N, 2 N and P N. Given that the three forces are in equilibrium, find the values of θ and P. [4]



Forces of magnitudes P N and 25 N act at right angles to each other. The resultant of the two forces has magnitude R N and makes an angle of θ° with the x-axis (see diagram). The force of magnitude P N has components −2.8 N and 9.6 N in the x-direction and the y-direction respectively, and makes an angle of α° with the negative x-axis.

(i) Find the values of P and R. [3]

(ii) Find the value of α, and hence find the components of the force of magnitude 25 N in

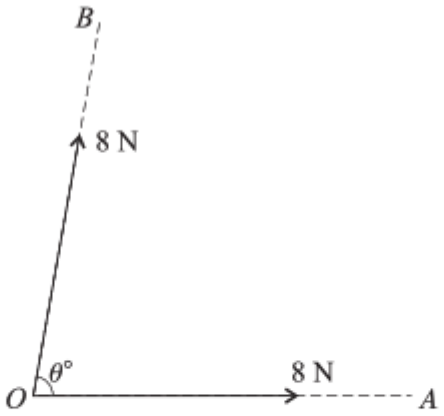
(a) the x-direction,

(b) the y-direction.

[4]

(iii) Find the value of θ. [3]

M/J/2007/Q2

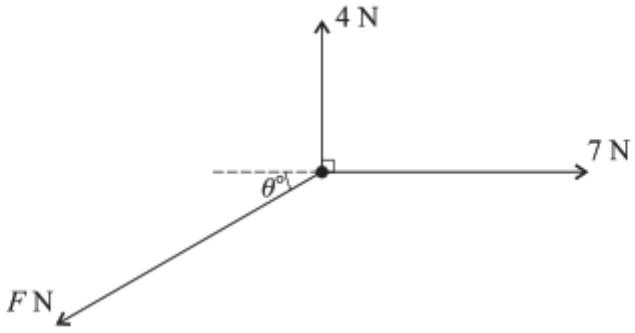


Two forces, each of magnitude 8 N, act at a point in the directions OA and OB. The angle between the forces is $\theta°$ (see diagram). The resultant of the two forces has component 9 N in the direction OA. Find

(i) the value of θ, [2]

(ii) the magnitude of the resultant of the two forces. [3]

O/N/2007/Q3

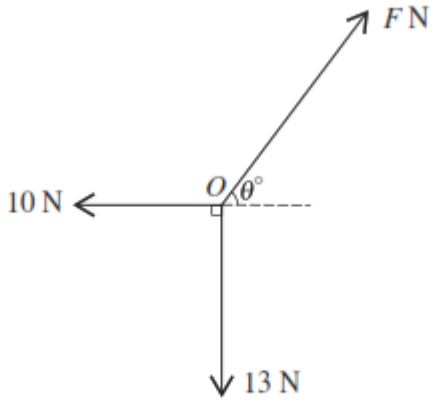


A particle is in equilibrium on a smooth horizontal table when acted on by the three horizontal forces shown in the diagram.

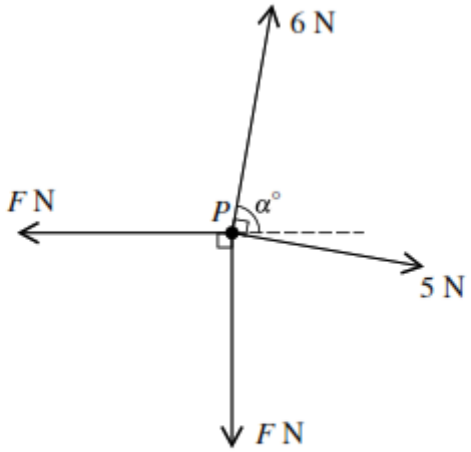
(i) Find the values of F and θ. [4]

(ii) The force of magnitude 7 N is now removed. State the magnitude and direction of the resultant of the remaining two forces. [2]

M/J/2008/Q3

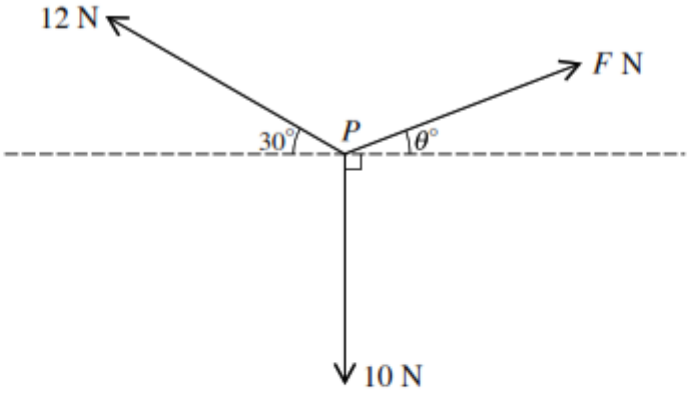


Three horizontal forces of magnitudes F N, 13 N and 10 N act at a fixed point O and are in equilibrium. The directions of the forces are as shown in the diagram. Find, in either order, the value of θ and the value of F. [5]



A particle P is in equilibrium on a smooth horizontal table under the action of four horizontal forces of magnitudes 6 N, 5 N, F N and F N acting in the directions shown. Find the values of α and F. [6]

M/J/20□□/Q□

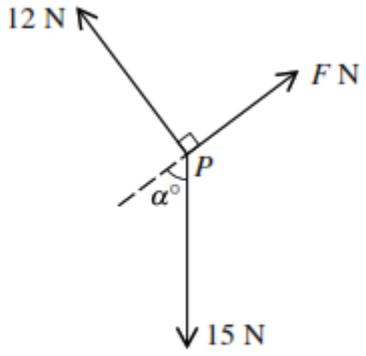


The three coplanar forces shown in the diagram act at a point P and are in equilibrium.

(i) Find the values of F and θ. [6]

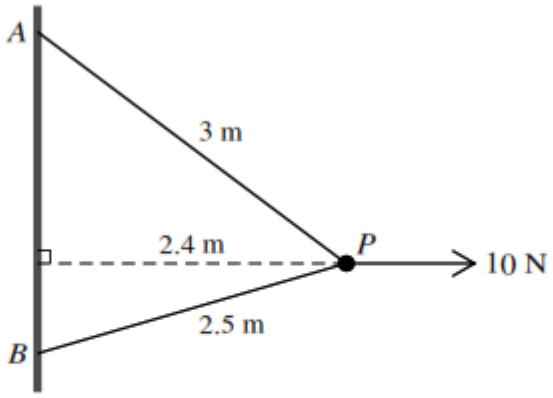
(ii) State the magnitude and direction of the resultant force at P when the force of magnitude 12 N is removed. [2]

M/J/2012/Q2

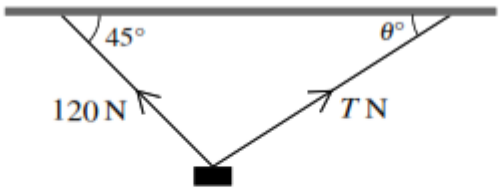


Three coplanar forces of magnitudes F N, 12 N and 15 N are in equilibrium acting at a point P in the directions shown in the diagram. Find α and F. [4]

M/J/2014/Q3

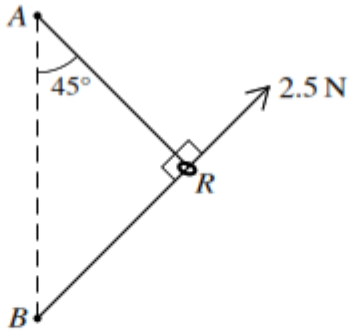


A and B are fixed points of a vertical wall with A vertically above B. A particle P of mass 0.7 kg is attached to A by a light inextensible string of length 3 m. P is also attached to B by a light inextensible string of length 2.5 m. P is maintained in equilibrium at a distance of 2.4 m from the wall by a horizontal force of magnitude 10 N acting on P (see diagram). Both strings are taut, and the 10 N force acts in the plane APB which is perpendicular to the wall. Find the tensions in the strings. [6]

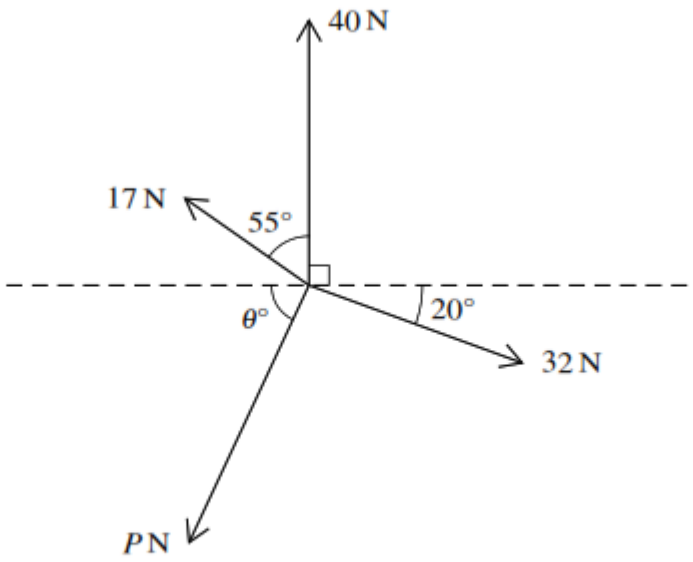


A block of mass 15 kg hangs in equilibrium below a horizontal ceiling attached to two strings as shown in the diagram. One of the strings is inclined at 45° to the horizontal and the tension in this string is 120 N. The other string is inclined at θ° to the horizontal and the tension in this string is T N. Find the values of T and θ. [6]

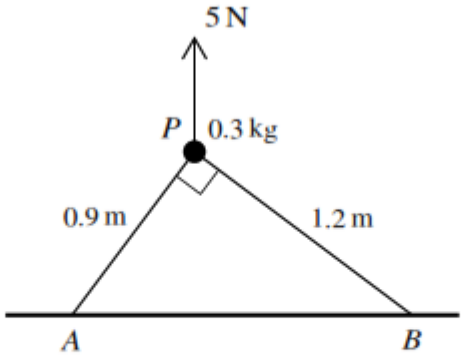
O/N/2018/Q1



A smooth ring R of mass m kg is threaded on a light inextensible string ARB. The ends of the string are attached to fixed points A and B with A vertically above B. The string is taut and angle $ARB = 90°$. The angle between the part AR of the string and the vertical is 45°. The ring is held in equilibrium in this position by a force of magnitude 2.5 N, acting on the ring in the direction BR (see diagram). Calculate the tension in the string and the mass of the ring. [4]



Coplanar forces of magnitudes 40 N, 32 N, P N and 17 N act at a point in the directions shown in the diagram. The system is in equilibrium. Find the values of P and θ. [6]



A particle P of mass 0.3 kg is held in equilibrium above a horizontal plane by a force of magnitude 5 N, acting vertically upwards. The particle is attached to two strings PA and PB of lengths 0.9 m and 1.2 m respectively. The points A and B lie on the plane and angle $APB = 90°$ (see diagram). Find the tension in each of the strings. [5]