



Department of Mechatronics Engineering

From Varignon's Theorem,

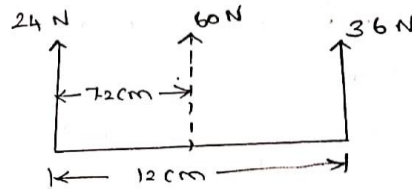
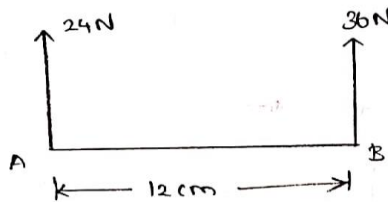
Sum of the moment of the forces F_1, F_2 and F_3 about "O" is equal to the moment of resultant force R , about the same point "O" (37)

$$\text{i.e. } F_1 d_1 + F_2 d_2 + F_3 d_3 = R \cdot d$$

Sum of the moment of all the forces about a point } = { moment of their resultant force about the same point.

Problem:

Find the resultant force for the parallel force system shown in fig.



Soln:

Magnitude of the resultant force, $R = 24 + 36 = 60 \text{ N}$.

The above system is like parallel force system. (as they act in same direction). Hence the resultant force will be in between the given forces.

where as unlike parallel force system, the resultant force will be either in between the given forces or outside.

Location of resultant force.

Algebraic sum of the moment about "A"

$$\sum M_A = (24 \times 0) - (36 \times 12)$$

(-ve sign for anticlockwise moment)

$$\sum M_A = -432 \text{ N-cm}$$

But moment of resultant force about

$$A = 2 M_A$$

$$R x = 432 \text{ N-cm}$$

$$60 x = 432$$

$$x = 7.2 \text{ cm}$$