

Module I: FORCES AND MOMENT

Session 2

Resultant Force

If a number of forces are acting simultaneously on a particle, then it is possible to find out a single force which could replace them *i.e.*, which would produce the same effect as produced by all the given forces. This single force is called *resultant force* and the given forces R etc. are called component forces.

Composition and resolution of Forces

The process of finding out the resultant force, of a number of given forces, is called *composition of forces*.

The process of splitting up the given force into a number of components, without changing its effect on the body is called *resolution of a force*. A force is, generally, resolved along two mutually perpendicular directions. In fact, the resolution of a force is the reverse action of the addition of the component vectors.

Principle of Resolution

It states, “The algebraic sum of the resolved parts of a no. of forces, in a given direction, is equal to the resolved part of their resultant in the same direction.”

Methods for the Resultant Force

Though there are many methods for finding out the resultant force of a number of given forces, yet the following are important from the subject point of view :

1. Analytical method. 2. Method of resolution.

The resultant force, of a given system of forces, may be found out graphically or analytically by the following methods:

1. Parallelogram law of forces (applied to two forces) – Graphical method
2. Triangle law of forces (applied to two forces) – Graphical method
3. Polygon law of forces (applied to several forces) – Graphical method
4. Cosine law method (applied to two forces) – Analytical method
5. Method of resolution (applied to several forces) – Analytical method