

# Resistant Body

A resistant body is a body that is not rigid yet behaves like one while operating in a machine. In practice, nobody is rigid since motion or force is always transmitted through some kind of deformation. As a result, the body should resist transmitting motion or force. [GATE exam](#) may carry MCQ-based question on resistant body or concepts related to it.

## Example of Resistant Body

A machine is a collection of rigid or resistant bodies that are made and connected in such a way that they move in specific relative motions and transmit force from the source of power to the resistance to be overcome. Examples of a resistant body are as follows:

- A chair that can support 120kg will behave like a rigid body up to that weight, but if the load is increased, it may deform. As a result, this chair is known as a resistant body.
- The cycle chain is the resistant body because it functions like a rigid body while transmitting motion to the cycle's rear wheel. The belt is in a belt and pulley setup.

## What is Rigid Body?

A rigid body is a solid body with no or minimal deformation that may be ignored. The distance between any two points on a rigid body remains constant over time, regardless of the external forces or moments acting on it. A rigid body is typically thought of as a continuous distribution of mass. Rigid bodies and its concepts are conceptually important for [GATE question paper](#).

A totally rigid body does not exist in the study of special relativity, and objects can only be assumed to be rigid if they are not travelling near the speed of light. [Equilibrium of rigid body](#) is one of the essential topics of the GATE notes. A rigid body is commonly thought of in quantum mechanics as a collection of point masses. Molecules, for example, are frequently seen as hard bodies.

## Difference Between Resistant Body and Rigid Body

Rigid bodies do not deform (regardless of the quantity and nature of force/torque applied). They do not exist in the real world; they are merely ideas.

Resistant bodies, on the other hand, are undeformable for the purpose they serve, but they may get deformed when used in other high-stress scenarios.

## Linear and Angular Position

A rigid body's position is the position of all the particles that make it up. To simplify the description of this posture, we take advantage of the body's rigidity, which means that all of its particles keep the same distance relative to each other. If the body is

stiff, describing the position of at least three non-collinear particles is sufficient. This allows you to reconstruct the position of all the other particles if you know their time-invariant position relative to the three selected particles. However, a different, mathematically more convenient, but identical strategy is frequently adopted. The entire body's position is indicated by:

- The linear position or location of the body, specifically the position of one of the body's particles chosen as a reference point (typically coinciding with the centre of mass or centroid of the body).
- The body's angular position (also known as orientation or attitude).

