

Chapter 1: General principles.

* **Branches of mechanics** $\rightarrow$ The study of forces and their effect.

- * **Rigid Body** $\rightarrow$ [1] **Static** $\rightarrow$ Deals with the equilibrium $\rightarrow$ In the rest $\rightarrow$ or move constant velocity
- * **undeformable** $\rightarrow$ [2] **Dynamic** $\rightarrow$ Concerned with the accelerated motion of bodies.
- * [3] **Deformable body change shape** $\rightarrow$
- * [4] **Fluid mechanics** $\rightarrow$ [1] Compressible $\rightarrow$ [2] Incompressible

* **Statics** :- Bodies at Rest (Equilibrium).

* **Dynamics** :- Accelerated motion of Bodies.

1.2 - Fundamental concepts :-

The basic Quantities :-

- [1] **Length** :- Used to locate the position of a point in space and thereby describe the size of a physical system.
- [2] **Time** :- Is conceived as a succession of events, although the principles of statics are time independent, this quantity plays an important role in the study of dynamics.
- [3] **Mass** :- Is a measure of a quantity of matter.
- [4] **Force** :- In general, force is considered as a "push" or "pull" exerted by one body on another.

Idealizations :- Models or idealizations are used in mechanics in order

(تبسيط النظرية) to simplify application of the theory.

* **particle** :- Has a mass, but a size that can be neglected. (جسيم)

* **Rigid Body** :- Can be considered as a combination of a large number of particles in which all the particles remain at a fixed distance from one another, both before and after applying a load.

* **Concentrated load** :- Represents the effect of a loading which is assumed to act at a point on a body. We can represent a load by a concentrated force, provided the area over which the load is applied is very small compared to overall size.