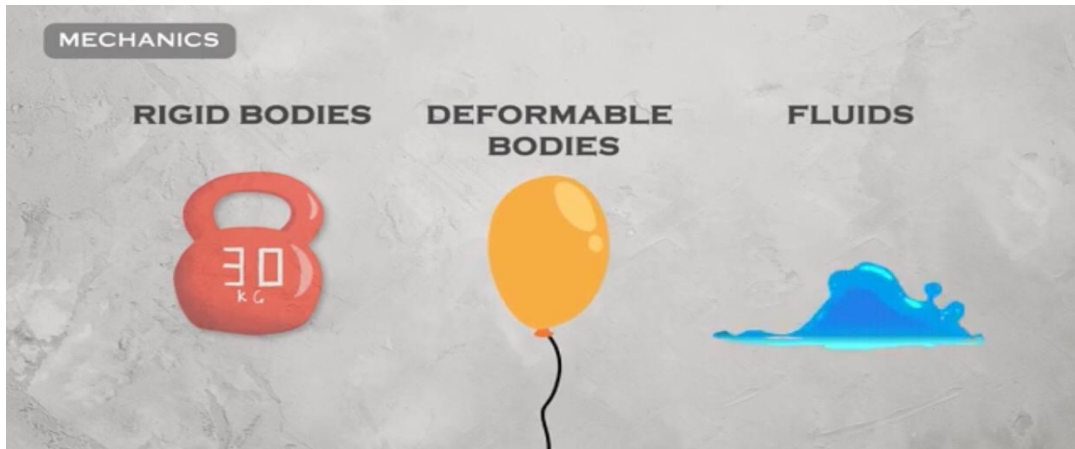
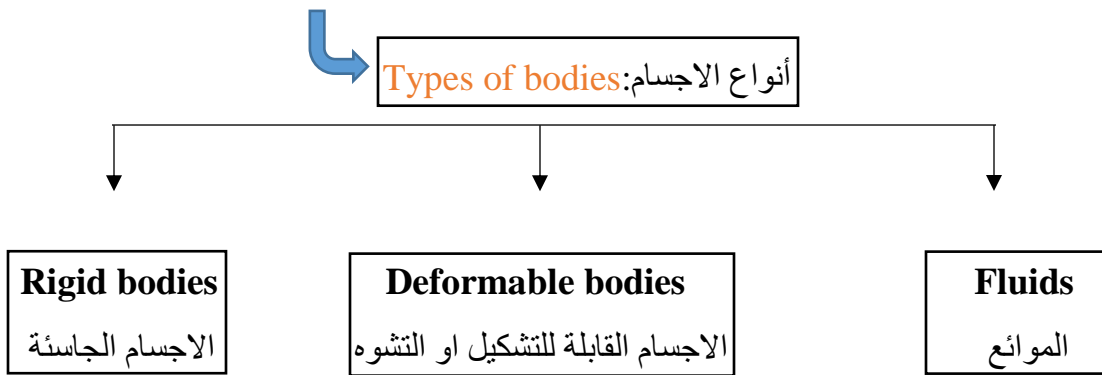


What is engineering mechanics?

ما هو الميكانيك؟

It is the science that describe the behavior of **bodies** in terms of a state of rest or **motion**, when subjected to **forces**.

هو العلم الذي يهتم بدراسة سلوك الاجسام الساكنة او المتحركة، عند تعرضها لقوى خارجية.



Rigid Body: is a solid body in which deformation is zero or so small that it can be neglected. The distance between any two given points on a rigid body remains constant in time regardless of external forces exerted on it.

- هو جسم صلب تعتبر التشوهات فيه مساوية للصفر او تكون قليلة جدا للحد الذي يمكن اهمالها. وبعبارة أخرى فان المسافة بين أي نقطتين في الجسم الجاسئ تبقى ثابتة مع مرور الزمن بغض النظر عن القوى الخارجية المؤثرة عليه.

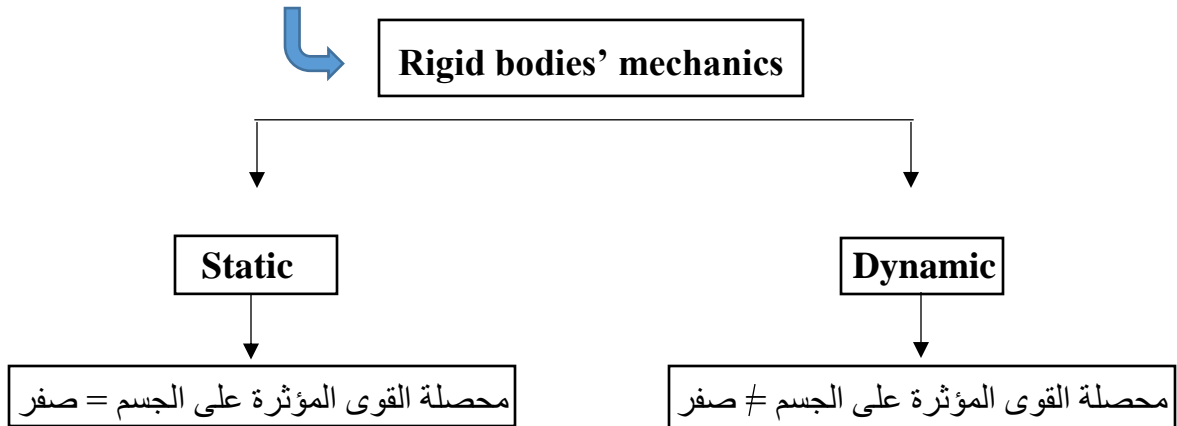
Deformable Body: anybody that changes its shape and/or volume while being acted upon by any kind of external force.

- أي جسم يخضع لتغيير في الشكل والحجم عند تعرضه لقوى خارجية.

Fluids: is a liquid, gas, or other material that continuously deforms (flows), under the effect of external forces.

- هي السوائل، الغازات أو أي مادة تتشوه (تتدفق) باستمرار تحت تأثير القوى الخارجية.

Our study treats only with **rigid bodies' mechanics**, so that the body stay in the same shape after applying the forces (no deformations are considered in the body).



Static: Deals with the equilibrium of bodies, that are either at rest or move with a constant velocity.

- تتعامل مع توازن الاجسام الساكنة او المتحركة بسرعة ثابتة.

Dynamic: is concerned with the accelerated motion of bodies under effects of external forces.

- تعنى بالأجسام المتحركة بسرعة متغيرة تحت تأثير قوى خارجية.

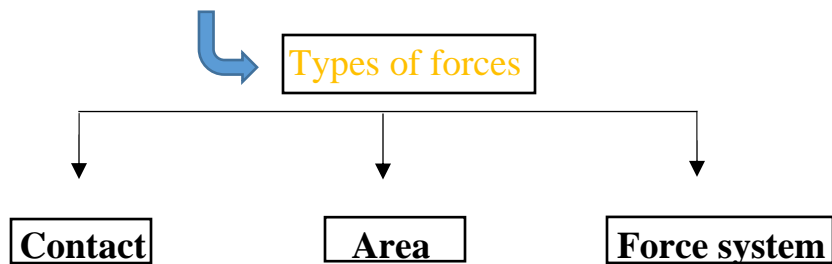
Vector and scalar quantities:

Vector quantities: are the quantities that have both magnitude and direction, Such as Force, weight, distance, speed, displacement, acceleration, and velocity.

Scalar quantities: are the quantities that have only magnitude, such as time, density and volume.

Force: is an action that changes or tends to change the state of motion of the body upon which it acts. It is a vector quantity can be represented either mathematically or graphically.

- هي الفعل الذي يغير او يحاول ان يغير من حالة الجسم الحركية. وهي كمية اتجاهية لها مقدار واتجاه.

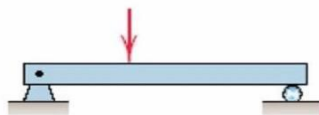


✓ Contact

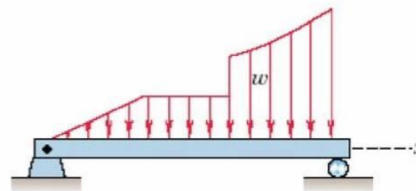
1. Contacting or surface force (mechanical).
2. Non-contacting or body forces (weight).

✓ Area

1. Distributed force, uniform and non-uniform.
2. concentrated force.



Concentrated Load



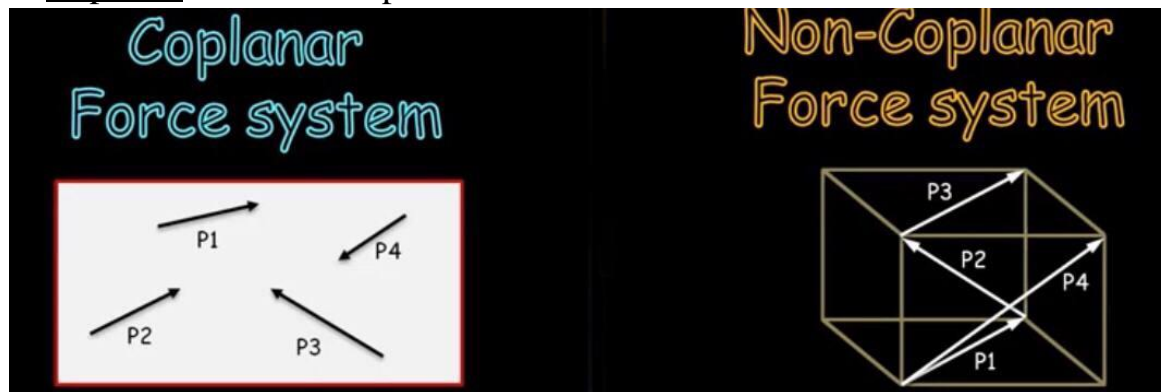
Distributed Load

✓ **Force system:** is a collection of forces acting at a specified location.

1. Concurrent: all forces pass through a common point.



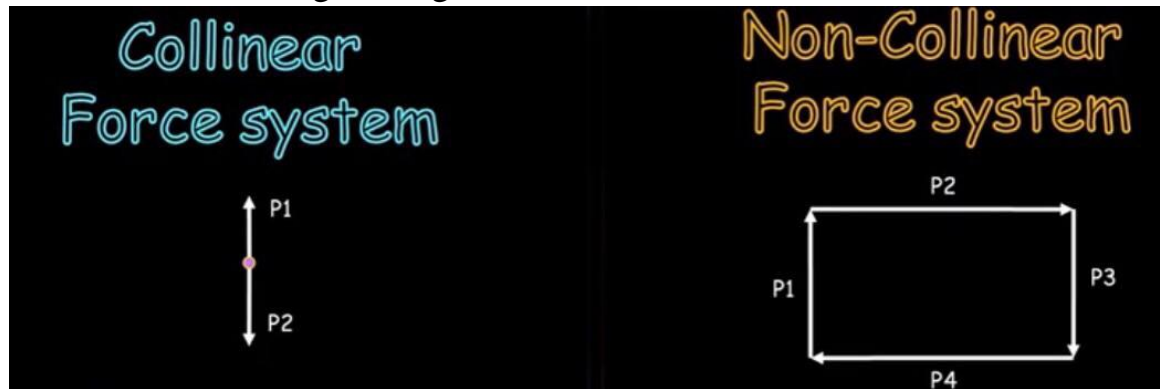
2. Coplanar: in the same plane.



3. Parallel: parallel to each other and their line of action is in the same direction.



4. Collinear: in a single straight line of action.



H.W. : Write the force system for each one of the following?

