

Name: ihtisham-ul-haq

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Department:AHS

Q1: what is the difference between statics and dynamics and kinematics and kinetics?

Statics:

- It is the branch of mechanics which deals with the analysis of loads and their effect on a system when its acceleration is zero or it is static equilibrium with the environment (relative motion is zero). the system may be stationary or its center of mass moves at constant velocity. However, the term statics usually represents the analysis of loads on a stationary rigid body. The loads on the system are force, torque, or momentum.

Kinematics:

- Kinematics is the branch of classical mechanics which describes the motion of points, bodies (objects), and systems of bodies (groups of objects) without consideration of the causes of motion. Kinematics as a field of study is often referred to as the "geometry of motion".

Dynamics:

- Every object experiences some form of motion which is the result of different forces acting on the object. Dynamics is the study of the forces which are responsible for this motion.

Kinetics:

- Kinetics is a term for the branch of classical mechanics that is concerned with the relationship between the motion of bodies and its causes, namely forces and torques. Since the mid-20th century, the term "dynamics" (or "analytical dynamics") has largely superseded "kinetics" in physics textbooks; the term "kinetics" is still used in engineering.

Q2: Explain mass, weight, force and torque along with units?

Mass:

Mass is both a property of a physical body and a measure of its resistance to acceleration (a change in its state of motion) when a net force is applied. An object's mass also determines the strength of its gravitational attraction to other bodies.

- Mass is not the same as weight, even though mass is often determined by measuring the object's weight using a spring scale, rather than balance scale comparing it directly with known masses. An object on the Moon would weigh less than it does on Earth because of the lower gravity, but it would still have the same mass. This is because weight is a force, while mass is the property that (along with gravity) determines the strength of this force.
- The basic SI unit of mass is the kilogram (kg).
- It is denoted by 'm'.

Weight: The weight of an object is the force of gravity on the object and may be defined as the mass times the acceleration of gravity, $w=mg$. Since the weight is a force,

- It's SI unit is Newton.
- It is denoted by 'w'.

Force:

- force is a push or pull upon an object resulting from the object's interaction with another object. Whenever there is an interaction between two objects, there is a force upon each of the objects.
- A force has both magnitude and direction, making it a vector quantity.
- It is measured in SI unit of Newton .
- Represented by the symbol 'F'.
- Unit=Newton.

Torque:

- Called moment of force,
- Torque is a measure of force that can cause an object to rotate about an axis.
- Torque is a vector quantity.
- Torque is measured in Newton meters in SI units.

Q3: explain in detail the different types of mechanical loads that acts in human body?

MECHANICAL LOADS ON THE HUMAN BODY:

Compression:

- Pressing or squeezing force directed axially through a body

Tension:

- Pulling or stretching force directed axially through a body

Shear Force:

- directed parallel or tangentially to a surface (ie. femur in knee flexion)

Bending Asymmetric loading:which produces TENSION on one side of a body's longitudinal axis and COMPRESSION on the other side

Torsion:

- **Load producing twisting of a body around its longitudinal**

Stress:

- **occur when forces are applied to a body that is constrained.in other words if the body does not move as a rigid body ,part of the body will be stretched or squeezed and stresses will develop within the body.**

Combined Loading:

- **Simultaneous**

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