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Assignment

BMT

Q1) Explain moment of force and principle of moment?

Ans) Moment of force:

In translational motion the linear acceleration of body depends on the force acting on the body, similarly, in rotational motion, angular acceleration depends on the moment of force or torque acting on the body. The ability of force to produce rotational motion is measured in terms of the moment of force. Its magnitude about the given axis depends on the magnitude of the force and the perpendicular distance of the line of action of force from the axis of rotation. The distance is called the moment arm.

Principle of moments:

If a body is in rotational equilibrium then the sum of the anticlockwise moments is equal to the sum of the clockwise moments.

OR if a body is in rotational equilibrium then the algebraic sum of the moments about any point is zero.

Q2 | Define equilibrium and different state of equilibrium?

Ans | Equilibrium :-

An equilibrium is a state of system where all force acting on the system is balanced. A system that is equilibrium means as such heat is entering and leaving some thing. Homeostasis is a living thing keep it internal balance.

State of Equilibrium:

There are three state of equilibrium.

Stable equilibrium

Unstable equilibrium

Neutral equilibrium

Stable equilibrium:

A body is said to be in stable equilibrium if it come back to its original position when it is slightly displaced.

When a body which is in stable equilibrium is disturbed it center of gravity is raised.

For example a book laying on the table is in stable equilibrium.

UNSTABLE EQUILIBRIUM

A body is said to be in unstable equilibrium if it does not come back to its original position when it is slightly displaced.

When a body which is in unstable equilibrium is disturbed its centre of gravity is lowered.

For example, pencil standing on its point or a stick in vertically standing position.

Neutral equilibrium.

If a body is placed in such a state that if it is displaced then neither it topples over nor does it come back to its original position, then such a state is called neutral equilibrium.

Q3] Define force, type of force, effect of force on various mechanical and structural members?

Ans] Force: a force in any interaction that when unopposed will change the course of an object. A force can cause an object with mass to change its velocity, i.e. to accelerate.

Type of force:

(i) Applied force:

An applied force is a force that is applied to an object by a person or another object.

If a person is pushing a desk across the room, then there is an applied force acting upon the object. The applied force is a force exerted on the desk by the person.

(ii) Gravity force:

The force of gravity is the force with which the earth, moon or other massively large object attracts another object toward itself.

By definition, this is the weight of the object. All objects upon earth experience a force of gravity that is directed downward toward the center of the earth. The force of gravity on the earth is always equal to the weight of the object.

(iii) Normal force:

The normal force is the support force exerted upon an object that is in contact with another stable object. For example, if a book is resting upon a surface then the surface is exerting an upward force upon the book in order to support the weight of the book.

(iv) Friction force:

The friction force is the force exerted by a surface as an object moves across it or ~~more~~ make an effort to move across it.

(v) Tension force:

The tension force is the force that is transmitted through a string, rope, cable or wire when it is pulled tight by forces acting from opposite ends. The tension force is directed along the length of the wire and pulls equally on the objects at the opposite ends of the wire.

(vi) Spring force:

The spring force is the force exerted by compressed or stretched springs upon an object that is attached to it. An object that compresses or stretches a spring is always acted upon by a force that restores the object to its rest or equilibrium position. For most springs specifically, for those that are said to obey "Hooke's Law" the magnitude of the force is directly proportional to the amount of stretch or compression of the spring.

(vii) Air Resistance force.

The air resistance is a special type of frictional force that act upon object as they travel through the air.

The force of air resistance is often observed to oppose the motion of an object. This force will frequently be neglected due to its negligible magnitude. It is most noticeable for object that travel at high speed.

Effect of force on mechanical and structural members:

A force acting on an object causes the object to change its shape or size, to start moving to stop moving, to accelerate or decelerate. When there's the interaction between two object they exert a force on each other, these exerted force are equal in size but opposite in direction.

for example

A force can move stationary object. Ex- The force of engine makes a stationary car to move.