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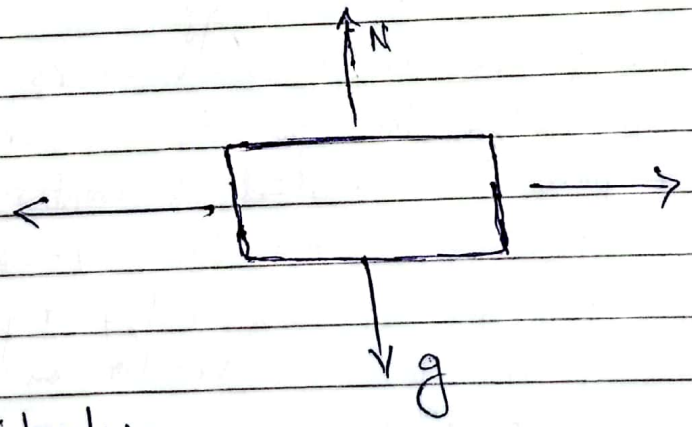
DEPT: BS(CS)

ASSIGNMENT #03"

Q NO:- I:-

(1) Describe shows Force vectors are defined and represented. Give example.

Ans:- A quantity that has both magnitude and direction. It is defined as quantities that represents a push or pull on an object. They are characterized by their magnitude, direction, and point of application.



⇒ Magnitude:-

It is a force vector represents the strength or intensity of the force. It is measured by Newton (N) or pounds (lb).

⇒ Direction:-

It is the force vector indicates the line along which the force is applied. The direction could be (South, north, east, west).

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=> Arrows Representations:-

Force vectors are typically represented graphically using arrows.

(ii) Define what is a Positin vectors? Give Examples?

A position vector is a mathematical concept used in geometry and physics to describe the position of a point in space relative to a reference point or origin.

Examples:-

Let's consider two dimensional cartesian system. The position vector of a point $P(x, y)$ relative to the origin $O(0, 0)$ can be represented as

$$r = xi + yj$$

Here, i and j are the unit vectors, x-axis & y-axis, respectively. The position vector "r" indicates that the point is located x units along the x-axis and y units along the y-axis, from the origin O. The coefficient x and y represents the components of the position vector in the x and y directions respectively.

For instance, If $P(3, 4)$ is a point in the coordinate system the position vector would be $r = 3i + 4j$.

P is located 3-units along the x-axis and 4-units along the y-axis from the origin.

(iii) Define Cartesian coordinates and give example?

Cartesian Coordinates also known as rectangular Coordinates are a system used to represent points in a two dimensional or three dimensional space.

(x, y) → Two-dimensional Coordinates

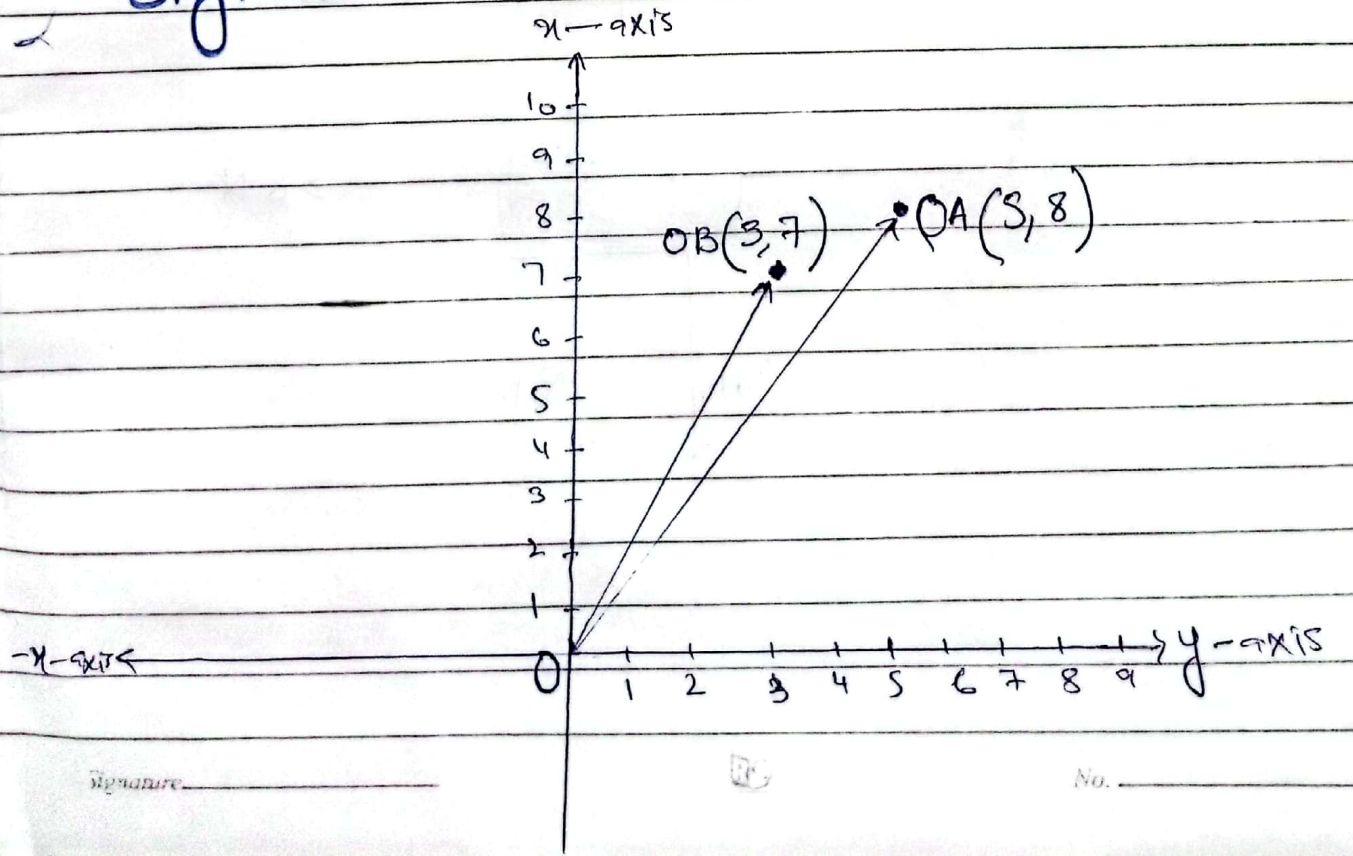
(x, y, z) → three-dimensional Coordinates.

for example,

A point representing an object in space could have the coordinates $(2, -1, 4)$ where it is located 2 units to the right, 1 unit from down, and 4 units from the origin.

(iv) Two position vectors OA(5, 8) and OB(3, 7) are given vectors with reference to O point. Draw their diagram showing their locations?

Diagram :-



Q No:2:- Define Equilibrium, give an example.
Define Free-Body-Diagram (FBD) give example

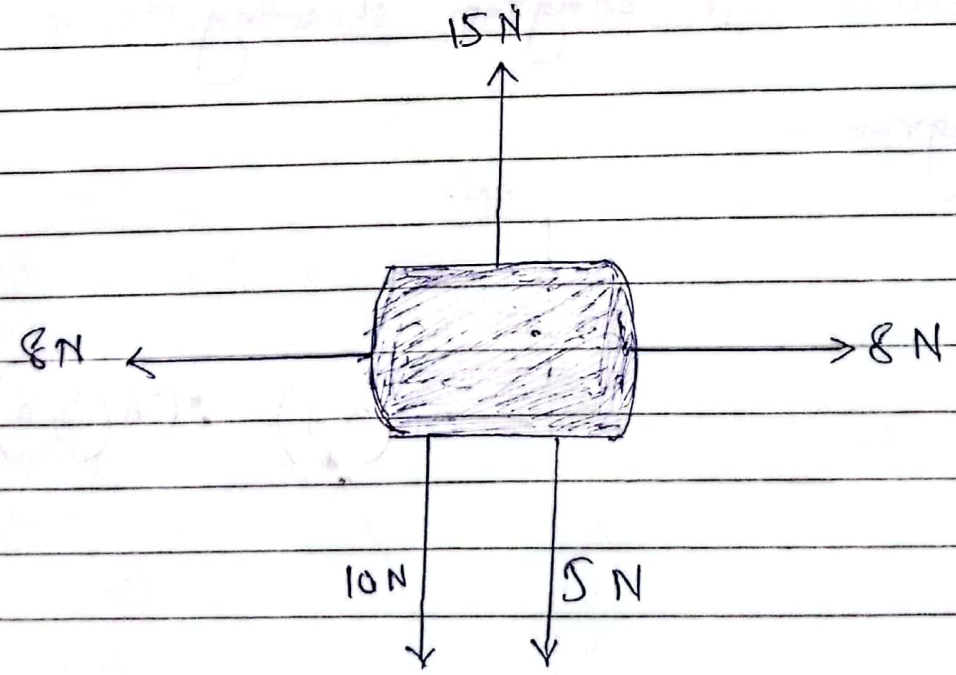
Equilibrium:-

If means, that the particle/object is at rest. Similarly if the particle/object is moving with Constant Velocity, and there is no acceleration, so it is equilibrium.

e.g:-

The condition of equilibrium is that sum of all forces acting on particle or object is zero.

$$\Sigma F = 0$$



FREE-BODY-DIAGRAM:-

⇒ It is a diagram.
⇒ It is graphical representation
⇒ It is an illustration (drawing).

And this diagram shows all the forces acting on an object/body.

We can also say that object is Isolated or free from all the forces acting on that object.

Procedure to draw Free Body Diagram:-

i) Draw Outlined Shape.
ii) Show all the Forces
iii) Identify Each Force.

Diagram:-