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Assignment : Basic Mechanical Technology

Q:1) A body of mass 1 kg undergoes a change of velocity of 4m/s, what is the force acting on it?

Ans) **Solution :-**

Acceleration = 4m/s
Force = Mass acceleration
Mass = 1kg
Acceleration = rate of change of velocity / rate of change in time.
Acceleration = 4/4
Acceleration = 1
To calculate force we know that
Force = mg
= 1 x 1
= 1 Newton ~~A.J.~~

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Q# 1 b) A force of 1200 N acts on the surface of area $10cm^2$ normally. What would be the thrust and pressure on the surface.

Solution)

Given Data

Force = 1200 Newton

Area = $10cm^2$ =

Divided the area value by thousand

= $0.001m^2$

We know that

Thrust is the force performing commonly to a sub surface.

Thrust = 1200 Newton

Pressure = Thrust / Area

= 1200 newton / 0.001 m square

= 1200000 Pascal

= 1.2×10^6 pascal.

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(Q2a) Define Equilibrium and its conditions.

Ans)

Equilibrium:-

The status of a system when neither its authorities of movement nor its interior force state run to alter with time. For a individual material, equilibrium rise if the vector total of all forces playing upon the material is nothing. An object is an equilibrium if;

- The resultant force acting on the object is zero.
- The sum of the moments acting on an object must be zero.

Triangle of forces:-

When an object is in equilibrium the forces acting on it will form a closed triangle.

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Example 1:-

A points (P) upon which all the forces are in equilibrium.

An object is an equilibrium if;

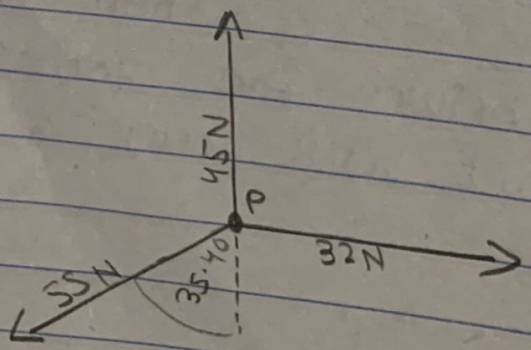
- The resultant force performing on the objective is nothing.
- The total of the moments playing on an physical object essential be nothing.

Triangle of forces:-

When an physical object is an equilibrium the forces playing on it will form a out of use triangle.

Example 1):

A point upon which all the forces are in equilibrium.



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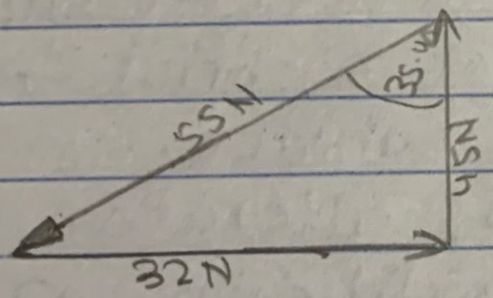
We issue the three forces higher up and conformity the size and path the same redraw them placing them head to end with each other. If the forces are in equilibrium the head of the last forces will run into the end of the first forming a out of use triangle, see the example below.



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Q2 b) Differentiate between stable and unstable Equilibrium and give proper examples you will observe in daily life.

Ans)

An Equilibrium is considered **stable** (for simpleness we will see straight line stability only) If the method always turning to it after small activity.
Example regard a weight supported by a spring or a brick fabrication on a plane surface.
If the method alteration away from the equilibrium after small interruption, then the equilibrium is **unstable.**
An example is a ball bearing symmetrical on the border of a edge tool leaf blade.

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Q# a) Define the following terms and give daily life example.

- Force
- Gravity force
- Friction force
- Spring Force
- Tension force

Ans) **Force :.**

Force is the push or pull on an physical object with mass that reason it to change velocity. Force symbolize as a vector, which way it has some magnitude and direction. In equations and diagrams a force is normally line by the symbol F. An example is an equation from newton second law of motion.

$F = ma$

where F is equivalent to force m is mass and a is acceleration.

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In SI unit of force is Newton.

Examples :-

- Gravity
- Nuclear force
- Electromagnets force.

Gravity Force :-

The gravitational Force is a force that pull any two physical object with mass. We call the gravitional force fascinatting because it ever effort to pull masses together, it ever pushes them apart, In fact, every physical object, including you, is pull on every other object in the full universe. This is called Newton's Universal law of Gravitional.

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F= Gmm/rsquare
F= Force of gravity
G= Gravitional constant ()/.
M = Mass of one objective.
m = mass of another objective
r = distance between the two object.

Examples::

- The force that grasp the gases in the sun.
- The force that reason a ball you stroke in the air to come fallen once again.
- The force that reason a car to seacost fall even when you aren't plain on the gas.

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Friction Force:.

Friction Force is a force that argue comparative movement between systems in interaction. One of the simplex identifying of resistance is that it is parallel to the interaction surface between systems and always in a direction that argue motion or unsuccessful motion of the systems comparative to each other.

Example:.

A good example is when you ride a bicycle on a road. The wheels of the bicycle move on the road. The bicycle will slow down until it comes to a halting.

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Spring Force:

The spring force is the force utilise by a tight or flexible spring upon any physical object that is connected to it. An object that dressing or stretches a spring is always human activity upon by a force that outlet the object to its rest or equilibrium point.

Example:

Your spring needs to travelling 2 inches and has a spring rate of 5 pounds. In order to know how much loading you'll need in order to make it achievable for the spring to travelling those 2 inches, plug in the belief into the above expression ($k = 5$, $x = 2$).

$F = kx$

$F = 5 \times 2$

$F = 10$

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Tension Force:

The tension force is defined as the force that is genetic through with a rope, cord or wire when pulling by forces acting from paired sides. The tension force is oriented over the fundamental quantity of the wire and pulls vigor equally on the organic structure at the ends.

Example:

Two pulling forces, straight opponent each other, that elastic an object and try to pull it isolated. For example, pull on a rope, a car towage another car with a chain – the rope and the chain are in tension or are "being taxable to a stress load".