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Paper Basic Mechanical Technology

Q3/ Define the following terms and gives daily life example.

Ans/ Force:

a force in any interaction that when unapposed will change the motion of an object. A force can cause an object with mass to change its velocity, i.e to accelerate.

OR

A force is a push or pull that cause an object to move faster or slower stop change direction. or change sizeor shape for example.

A foot ball is sitting at rest. it takes an unbalanced force of a kick to change its motion.

Gravity force:

Gravitational force is the force of attraction between all masses in the universe. especially the attraction of the earth mass for bodies near it surface.

OR/ gravity is a natural phenomenon by which all thing with mass or energy including planets, stars, galaxies and even light are brought toward one another

on earth gravity gives weight to physical object, and the Moon's gravity causes the ocean tides.
for example:
every object applies a gravitational force to every other object
So why does an apple from a tree?
The apple because it is more attracted (gravitational force) to the earth than it is to the tree.

friction force:
The friction force is the force exerted by a surface as an object moves across it or more an effort to move across it.
for example:
cars stop by using break which use friction to stop the rotation of the wheels.

spring force:
The spring force is a force exerted by a compressed or stretched spring upon any 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.

Tension force:.
The tension force that is transmitted through a rope, string or wire when pulled by force acting from opposite sides. The tension force is directed over the length of the wires and pulls energy equally on the bodies at the end.
Hence, tension can only pull an object.
for example:
if we pull a string from both side, string applies tension force. string hope that is length will remain constant. The cable support the diff experiences tension.

CO2 (e) Define Equilibrium and its Conditions.

Ans/ EQUILIBRIUM:

It there is no change in the state of motion of a body the body is said to be in equilibrium

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

First Condition of Equilibrium

This means that both the net force and the net torque on the object must be zero. The condition $\Sigma F_{net} = 0$ $\Sigma F_{net} = 0$ must be true for both static equilibrium, where the object velocity is zero, and dynamic equilibrium, where the object is moving at a constant velocity.

Second condition of equilibrium:
But an object in equilibrium also does not rotate that means the sum of all the torque on an object is equilibrium is zero.
this is the second condition of equilibrium.

(Q2b) Differentiate between Stable and unstable Equilibrium and give proper example you will observe in daily life.
Stable Equilibrium:-
A body is said to be in stable equilibrium if after a slight tilt it returns to its previous position.
:) its center of gravity is at lowest position. when it is tilted, its center of gravity rises. it returns to its stable equilibrium as long as the center of gravity acts through the base of the body
for example:
A book lying on the table.
Tilt the book slightly about its one edge by lifting

it from the opposite side it returns to its previous position when sets free.

unstable equilibrium
if a body does not return to its previous position when sets free after the slightest tilt is said to be in unstable equilibrium.
The center of gravity of the body is at its highest position in the state of unstable equilibrium. As the body topples over about its base its center of gravity move toward its lower position and does not return to its previous position.
for example
Take a pencil and try to keep it in the vertical position on its tip.
whenever you leave it the pencial topples over about its tip and falls down. This is called an unstable equilibrium. in an unstable equilibrium a body may be made to stay only for a moment.

~~a = Initial~~

Q1/ A body of mass 1 kg undergoes a change of velocity of 4 m/s what is the force acting on it?

Ans Given data

Mass of body = 1 kg

change of velocity = 4 m/s

Time = 4 s

acceleration = ?

acceleration = a = $\frac{4 \text{ m/s}}{4 \text{ s}}$

$= 1 \text{ m/s}^2$

force = F = ma

m = 1

a = 1

F = ma $\Rightarrow$ F = 1 x 1

= 1 N

Q2/ A force of 1200N acts on the surface of area $10 cm^2$ normally. what would be the thrust and pressure on the surface.

Given data

Force $\Rightarrow$ F = 1200N

Area $\Rightarrow$ A = $10 cm^2 = 10 \times 10^{-4} m^2 = 10^{-3} m^2$

Thrust = Normal pressure = F = 1200N

Pressure P = F/A 1200N $10^{-3} m^2$ 1200N/$10^{-3} m^2$

$= 1.2 \times 10^6 N/m^2$