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SUBJECT :- Applied Physics

Q1 (a) Keeping in view SI units. solve the following.

(1) A body's temperature is 143.4°C. What is temperature in kelvin?

Ans:-

$$K = °C + 273.15$$

$$= 416.55 °K$$

(2) An item has temperature of 2596 degree k. What is its temperature in celsius.

Ans :-

$$T(°C) = T(K) - 273.15$$

$$= 2596°K - 273.15$$

$$= 2322.85°C$$

(3) An item has a mass of 4.76g & volume 0.54cm³, calculate its density!

Solution

$$\text{density} = \frac{\text{mass}}{\text{Volume}}$$

$$\rho = \frac{m}{V} = \frac{4.76}{150}$$

$$= 0.0000952 \ kgm^{-3}$$

(a) 1b :- Convert the following

(i) 257, 600 meters to kilometers.

Ans :-

$= \frac{257600}{1000}$ 257.6 Km

= 257.6 Km

(ii) 583,00 milliliters to liters

Ans :- $\frac{\text{Volume}}{1000} = \frac{58300}{1000}$

= 58.3 liters

(iii) 8742 centimeters to meters

Ans :- Divide the length value by 100

$= \frac{8742}{100}$

= 87.42 meters

(IV) 869 kg to grams.

Ans: Multiply the mass value by 1000.

$= 869 \times 1000$

$= 869000$ grams.

V) 10^4 milligram to gram.

Ans:- Divide milligram by 1000.

$= \frac{10^4}{1000}$

$= \frac{10000}{1000}$

$= 10$ grams

Q2(a) Write what is dif between the below terms.
Distance & displacement, Speed & Average speed, Positive acceleration & Negative acceleration. with an example of each.

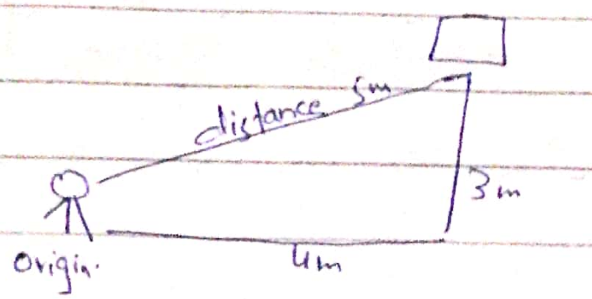
Ans:- **Distance**

Distance is a scalar quantity how much ground an object has covered during its motion.

Displacement

Is a vector quantity that refers to how far ~~far much ground~~ out of place an object overall change in position.

Example:-



displacement = 7m.
The change in position.

Speed & Average speed

Speed is speed, or how fast something is going while velocity is speed or how fast something is going in a specific direction.

Average speed is added up & divide by number of speeds, & you do the same time to calculate average velocity.

example:-

Driving east between two cities. A car speed is 60mph On the return trip it drives 30mph.

Positive acceleration & Negative Acceleration:-

If the velocity of an object increase with time its acceleration is positive.
If the velocity of an object decrease with time its acceleration is Negative.

Example:-
When the cars is accelerated. when the car speed up the acceleration when the car speed down the acceleration is negative.

Q26:-

Solution

$V_i = 8 m/s$

$V_f = 0 m/s$

Distance $= s = 19 m$

Acceleration $= a = ?$

$$2as = V_f^2 - V_i^2$$

$$a = \frac{V_f^2 - V_i^2}{2s}$$

$$= \frac{(0)^2 - (8)^2}{2(19)}$$

$$= \frac{0 - 64}{38}$$

$$= \frac{-64 m/s^2}{38}$$

$$= -1.6842 m/s^2$$

Q3a Describe in detail & prove mathematically First & Second law of motion from daily action of life?

Ans:- First law of motion:-

Newton's first law states that a body stays at rest if it is at rest and moves with a constant velocity until if a net force is applied on it Newton's second law states that the net force applied on the body is equal to the rate of change in its momentum.

Mathematically:-

$$F = ma \quad \text{or}$$

$$f = m(v-u)/t \quad \text{or}$$

$$ft = mv - mu.$$

That is when $F = 0$, $v = u$ for whatever time, t is taken. This means that

Object will continue moving with uniform velocity u throughout the time, t if u is zero then v will be also zero i.e Object will remain rest.

For example:- A book lying on a table or a table laying in a room, they will not change their position until an external force acts on it. The other part of the law is "if a body is in uniform motion in a straight line it will continue its state until it is acted upon an external force.

* Second law of motion:-

Netwon's second law of motion can be formally stated as follows:

The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force in the same direction as the net force, and inversly proportional to the mass of the object.

<u>Second law of motion formula</u>:.

Let us consider an object of mass m, moving along a stright line with an intial velocity u. Let us say, after a certain time t, with a constant acceleration the final velocity becomes v.

Here we see that the initial momentum $(P_1) = m(u)$

The final momentum $(P_2) = m(v)$.

The change in momentum can be written as

$p_2 - p_1 = (m \times v) - (m \times u) = m(v-u)$

As we know the rate change of momentum with respect to time is proportional to the applied force. The applied force

$$(f) \propto \frac{(m(v-u))}{t}$$

OR

$$f \propto m(a)$$

as acceleration (a) = rate of change of velocity with respect of time $f = k(m)(a)$.

example:-

When ridding a bicycle, the ~~object~~ bicycle acts as mass and our leg muscles pushing on the pedals or the bicycle is the force.

Q3b

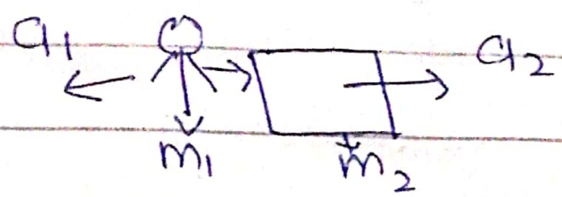
Ans **THIRD LAW OF MOTION:-**

Action & reaction are same in magnitude but opposite in ditection.

The statment means that in every interaction there is a pait of ~~porang~~ forces acting on the two interacting objects. The sizes of the fotces on the first object equals the size of the force on the the second object.

accelerations: $F_1 = -F_2$

$m_1 a_1 = -m_2 a_2$



Examples :-

1:- Hitting a wall

Because of Netwton's third law you hit the wall with a force & that exact same amount of force is returned by the wall.

2:- Rowing a boat.

While rowing a boat, when you want to move forward on a boat, you paddle by pushing the water backwards, causing you to move forward.

3:- Walking:-

While walking you push the floor or the surface you are walking on with your shoes, And the surface pushes your legs up. helping you to lift your legs up.