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Paper applied Physics

write what is the difference between the below terms:

(a) Distance and Displacement, speed and Average speed, Positive acceleration and Negative acceleration give example of each case.

Ans/

Distance	Displacement
1. Length of actual Path travelled by an object	(1) shortest length between initial and final position of an object
(2) it is a scalar quantity	(2) it is a vector quantity.
(3) it remains Positive Can't be '0' or negative.	(3.) it can be Positive negative or zero.
(4) Distance can be equal to displacement or its greater than displacement.	(4) Displacement can be equal to distance or its lesser than distance.

Speed

speed being a scalar quantity is the rate at which an object covers distance

$$\text{speed} = \frac{\text{distance Covered}}{\text{time taken}}$$

$$v = \frac{s}{t}$$

speed of a moving body can be never be negative.

Average Speed

The average speed is the distance (a scalar quantity) per time ratio. speed is ignorant of direction

$$\text{Average speed} = \frac{\text{T.d.C}}{\text{T.T}}$$

$$v = \frac{\Delta s}{\Delta t}$$

Constant speed speed that does not change over a period of time.

Positive Acceleration

The acceleration that is produced by increasing speed is called Positive acceleration.

Negativ acceleration

The acceleration that is produce by decreasing speed is called negative acceleration

Positive Acceleration That mean the direction of the acceleration determines whether you will be adding to or subtracting from velocity.

Negative acceleration negative acceleration means you will subtract from the current value of the velocity.

if your velocity is changing in the positive direction and the velocity is positive

moves in a direction opposite of the positive direction.

Q1 b| convert the following

Q1 (b)2 58,300 milliliter to liters

Solution:

$$L = \frac{ml}{1000.0}$$

$$L = \frac{58,300}{1000}$$

$$L = 58.3L$$

Q1 (b)1 257,600 meters to kilometers

Solution:

formula for conversion of meters in kilometers is given below.

kilometers = meter ÷ 1000

$$\text{kilometers} = \frac{257600}{1000}$$

$$= 257.6 \text{ km}$$

Q1(b) 3 87,421 centimeters to meters

Solution:

formula for conversion

$$\text{meter} = \frac{\text{cm}}{100}$$

$$m = \frac{87421}{100}$$

$$m = 814.21 \text{ meter}$$

Q1(b) 4 869 kilogram to grams

Solution

$$m(g) = m(kg) \times 1000$$

$$m(g) = 869 \times 1000$$

$$= 869.000g$$

Q1(b)5 10^4 milligram to gram

Note $10^4 = 10,000$

Solution

$$m(g) = m(mg)/1000$$

$$= \frac{10,000}{1000}$$

$$= 10\ g$$

Q2/a/Plan item has a mass of 4.76g and volume 0.54 cm^3, Calculate its density?

Solution:

Given data

Mass = 4.76g

volume = 0.54 cm^3

density = ?

formula of Density

$$D = \frac{m}{v}$$

Putting the value

$$D = \frac{4.76g}{0.54 cm^3}$$

$$= 8.814\ g/cm^3$$

Q1/a/1/ A body temperature is 143.4° C. what is this temperature in kelvins?

Solution

Given data

$T(C) = 143.4 C$

$T(K) = ?$

formula of conversion of celisius into kelvin is

$T(K) = T(C) + 273.15$

$T(K) = 143.4 + 273.15$

$T(K) = 416.55\ K$

Q1(a)(2) An item has temperature of 2596 degree k. what is its temperature in celsius.

Solution

Given data

$T(K) = 2596,\ T(C) = ?$

formula for the conversion of kelvin temprature into celsius is

$T(C) = T(K) - 273.15$

Put value

$T(C) = 2596 - 273.15$

$T(C) = 2322.85\ C$

Q3(a) Describe in detail and prove mathematically first and second law of motion with giving an example for each law from our daily life.

Ans

Newton 1st law:

An object at rest stays at rest an object in motion stays in motion with the same speed in the same direction unless acted upon by an unbalanced force.

Explanation:-

The key point here is that if there is not net force resulting from unbalanced force acting on an object. then the object will maintain a constan velocity of that velocity is zero, then the object remain at rest. and of an additional external force is applied the velocity will change because of the rate of change of momentum = $m\frac{(v-u)}{t}$

According to the 2nd law

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

~~$f = k\, m(v-u)$~~

$$f = k\,\frac{m(v-u)}{t}$$

where k is proportionality constant

$f = kma$

(Since $\frac{v-u}{t} = a$)

where a is the acceleration of the body

Note:

if the mass of the body is 2kg moving with ~~a force is given by~~ an acceleration of m/s^2, 1 unit of force is given by

1 unit of force $= k \times 1kg \times 1m/s^2$

Thus, the value of k becomes 1

$f = ma$ proved

Newton 2nd law of motion:
The rate of change of momentum of an object is directly proportional to the applied unbalanced force in the direction of force.
mathematically.

$$F = m \times a$$

Prove:

The momentum of a body is given by: $P = mv$
Let the initial velocity of the body be u and the final velocity be v. The final momentum of the body depend upon the final velocity So the change in momentum of a body is given b

$$mv - mo$$
$$= m(v - u$$

Q2 b/ A car is moving with a velocity of 8 m/s The driver applies brakes and the car comes to stop after covering a distance of 16 m. Calculate its acceleration?
Given data

$v_f = 8$ m/s
$u_i = 0$ m/s

$s = 19m$

$a = ?$

Solution

using formula

$$2as = v_f^2 - v_i^2$$

Putting value

$$2a(19) = (8)^2 - 0$$

$$38a = 64$$

$$a = \frac{64}{38}$$

$$a = 1.68\ m/s^2$$

Q3(b) explain third law of motion by deriving its equation in terms of mass and acceleration Give three example of this law from daily action of life.

Newton 3rd law of motion:

To every action is always an equal and opposite reaction.

Explanation:-

According to newton third law of motion: whenever one exerts a force on another body, the second body

exerts an equal and opposite from on the first body. The force exerted by the first body on the second body is called action force and the force exerted by the second body on the first body is called reaction force. Action force and reaction force act on two different bodies, but they act simultaneously.

or

Newton's third law of motion state that every action has equal and opposite reaction. if f_{AB} is a force of A body A acting on B and F_{BA} is force by B on body A. The mathematical expression is given by.

$$F_{AB} = F_{BA}$$

where f_{AB} is an action on B while f_{BA} is reaction of a body on A. Negative Sign indicates that force acting on a body A is in opposite direction to the force which is acting on body B.

example 1) when you jump of a small rowing boat into water you will push your self forward toward the water. The gave force you used to push forward will make the boat move back words.

example 2) when air rushes out of a ballon, the opposite reaction is that the ballon flies up.

example 3) when you drive off a diving board you push down on the spring board. The board spring back a force you into the air.