Autumn Holiday Homework

Physics

1) Comparing an unknown quantity with some known quantity is called meaurement. Meaurement is expreced as Length, mass, volume, time and Temperature. Length - m, mass - kg, volume - L, time - s and temperature - K.

2) The two smaller units of volume are cm^3 and dm^3.

Relationship between m^3 and cm^3

$1m^3 = 1m \times 1m \times 1m$

$1m^3 = 100cm \times 100cm \times 100cm$

$1m^3 = 10^6 cm^3$

Relationship between m^3 and dm^3

$1m^3 = 1m \times 1m \times 1m$

$1m^3 = 10dm \times 10dm \times 10dm$

$1m^3 = 10^3 cm^3$

(Note :- $1m = 10dm$)

3) The SI unit of mass is kg and volume is cubic metre. The SI unit of density is kg/m^3. The CGS unit of mass is gram and volume is cm^3. The CGS unit of density is g/cm^3.

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Relationship between kg/m3 and g/cm3

1kg = 1000g or $1g = \frac{1}{1000}kg$

$1m^3 = (100cm)^3$

$100 \times 100 \times 100 = 10,00,000\ cm^3 = 10^6\ cm^3$

4) Volume $\Rightarrow m \times m \times m = m^3$

$\Rightarrow 1m \times 1m \times 1m = 1m^3$

9) density $= \frac{M}{V}$

$\Rightarrow \frac{800kg}{1\ m^3} = 800kg/m^3$

5) Volume $= V_2 - V_1$

$\Rightarrow 30ml - 20ml = 10ml$

$\Rightarrow 1ml = 1cm^3$

$\Rightarrow 10ml = 10cm^3$

density $= \frac{M}{V}$

$\Rightarrow \frac{115}{10\ cm^3} = 11.5\ g\ cm^{-3}$ $\left(1gcm^{-3} = 1000kgm^{-3}\right)$

$= 11.5 \times 1000 = 11500\ kgm^{-3}$

6) i) In rotatory motion, the axis of rotation passes from a point in the body itself whereas in circular motion, the axis of revolution passes through a point outside the body. Thus, the motion of earth around the sun is the circular motion whereas the motion of earth on its own axis is the rotatory motion.

ii) In the circular and rotatory motion, the distance of a point of the body from a fixed point always remain same, whereas it is not same in curvilinear motion.

7) Periodic motion :- A motion which gets repeated after regular intervals of time is called a periodic motion. Ex :- The earth moving around the sun takes 365 days to complete one revolution and this motion gets repeated after every 365 days.

Non-Periodic motion :- The motion which does not repeat itself after regular interval of time is called non-periodic motion. Ex :- A footballer running on a field, application of brakes in a moving vehicle, a ball rolling down the ground gradually slows down and finally stops,

motion of tides in the sea, etc.

8) The weight of a body is the force with which earth attracts the body i.e the weight of a body is the force of gravity on it. The weight of a body is not conitant, but changes from place to place. It is represented by the symbol W. The SI unit of weight is newton (N).

9) Total distance = 30 + 30 = 60m
Total time = 1min + 1.5min = 2.5min
= 2.5 × 60s = 150s

Average speed => $\frac{60m}{150s}$ = $0.4ms^{-1}$

The motion is non-uniform.

10) Total distance = 30 × 0.5
= 15 km
Total distance = $40 kmh^{-1}$ × 1hr
= 40km.
=> 40km + 15km = 55 km.

Total time = 0.5 hrs + 1.0 hrs = 1.5 hr

Average speed = $\frac{55 \text{ km}}{1.5 \text{ hr}}$

$\Rightarrow 36.67 \text{ km hr}^{-1}$

11) The potential energy of a body in the raised position depends upon the following two factors:-

a) The mass of the body :- Greater the mass of the body, greater is the potential energy of the body.

b) Its height above the ground :- Higher the height of the body, greater is its potential.

12) Yes, a body possesses energy even when it is not in motion. Consider a body raised to a certain height say h. Its velocity is zero. Kinetic energy will be zero but the body will have.

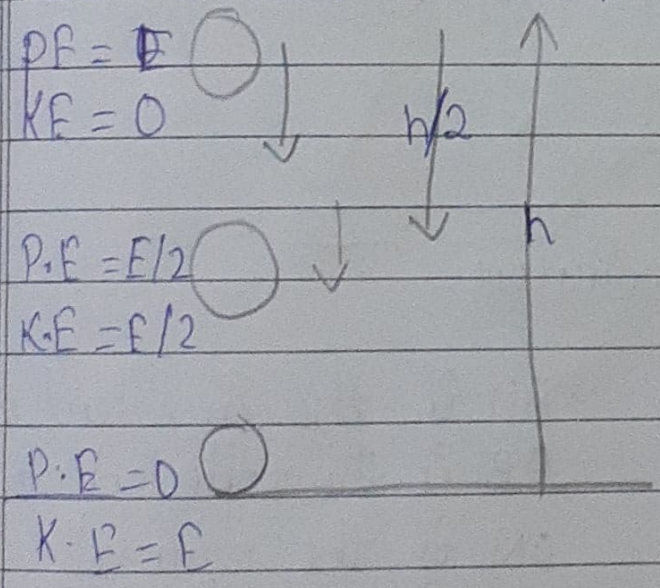
P.E = mgh

Thus, a body may possess energy even though it is not in motion.

B) The water in motion in a river or sea has the kinetic energy. The energy possessed by the flowing water is called hydro energy. The most important use of hydro energy is to produce electricity from it.

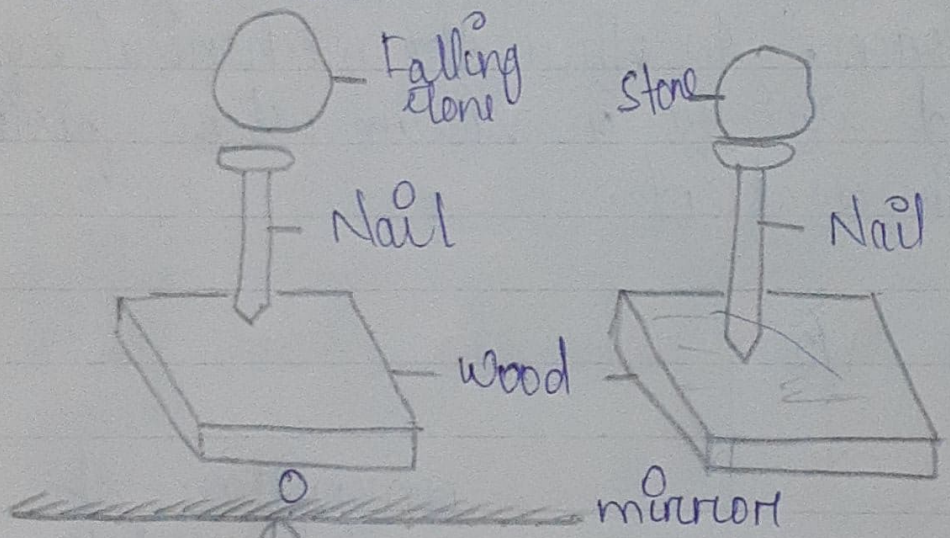
14) This means "The total Mechanical Energy (P.E+K.E) of an isolated system at any instant is equal to the sum of Kinetic energy and the potential energy."

Condition :- Condition under which the mechanical energy is conserved is "When there is no frictional Forces." In other the mechanical energy is conserved strictly in vacuum where friction due to air is absent.

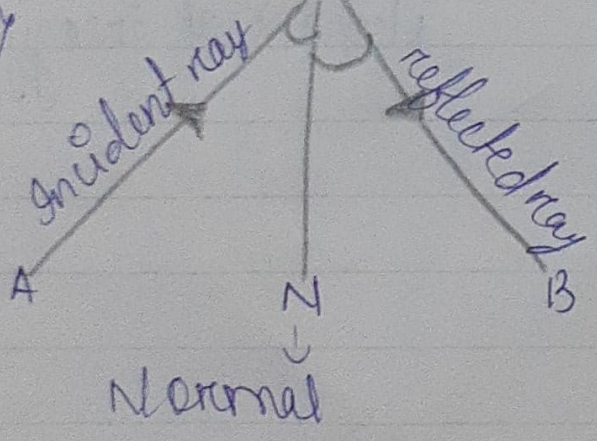


conservation of Mechanical energy.

15) The example to show the conversion of potential energy to kinetic energy when put in use is:- A stone at a height has the potential energy due to its lifted or raised position. In the figure below when the stone is dropped from that position, it begins to fall. The falling stone has the kinetic energy. Thus, the potential energy stored in the stone in its raised position changes into the kinetic energy when the stone is falling. This kinetic energy does work on the nail as the stone strikes the nail and makes the nail to move into the wood.

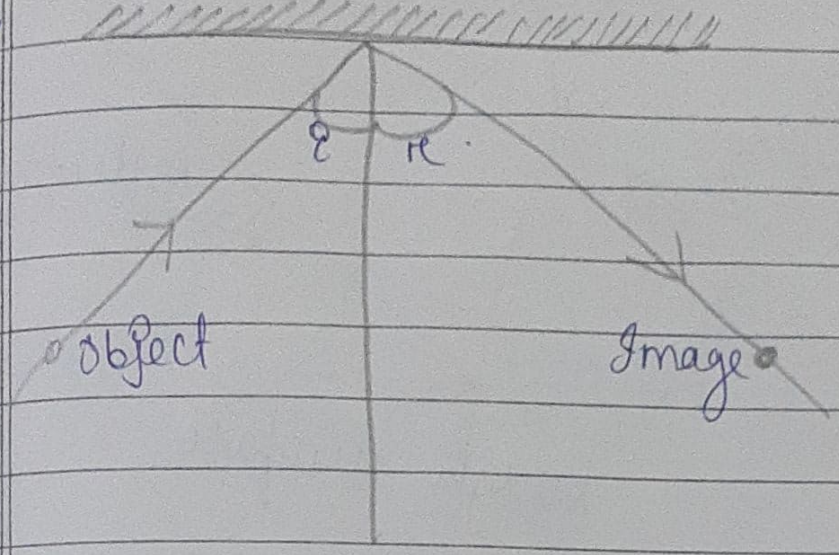


16)



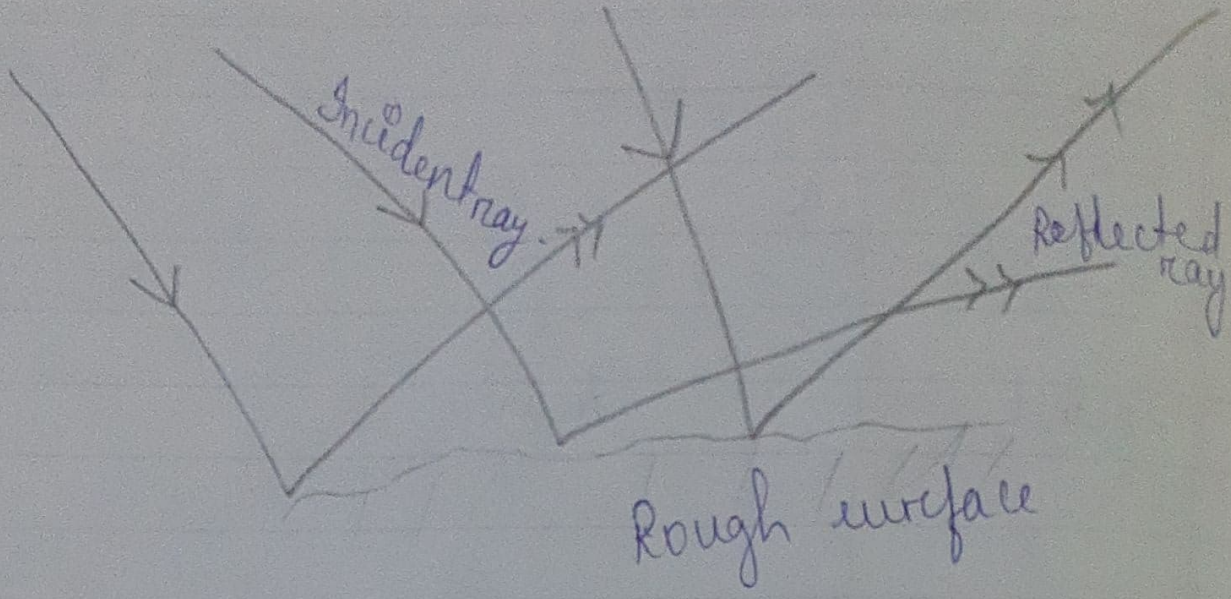
AO is the incident ray
OB is the reflected ray
ON is the normal
∠AON is the angle of incidence
∠NOB is the angle of reflection

17)



18) (i) The Image is virtual.
(ii) The Image is erect.
(iii) It has same size as the object.
(iv) The image is laterally inverted.

19) Irregular reflection :- When a beam of light falls on such a surface which is not perfectly smooth and polished such as wall, wood, paper etc - the different portions of the surface reflect light in different directions. Such a reflection of light in different direction. Such a reflection of light from an uneven surface is called the irregular or diffused reflection.



20) i) If a red rose is seen in green light, it appears black. The reason is that the rose absorbs the green light falling on it and reflected none.

ii) If a red rose is seen in red light, it appears bright red. This is because the rose reflects the red light falling on it and absorbs none of it.