PHYSICS EXAM

MARKING SCHEME

Qn. 01.

01@ = 10 marks

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	B	A	C	C	B	B	A	B	C

QN 02:

01@ = 5 marks.

i	ii	iii	iv	v
G	C	F	D	B

QN 03

@(i) Magnetisation is the process of aligning the atomic dipoles in a material in one direction to produce a net effect of attraction or repulsion while demagnetization is the process of distroying the magnetic properties of a material

2 marks

(ii) Properties of magnet (@1 mark.

i/ All magnets have two pole i.e the north and south pole

ii/ Magnetic force is an action at a distance force.

iii/ The magnetic force is strongest near the poles of a magnet.

iv/ The North pole of a freely moving magnet points north and the south pole points South

v/ Magnet exerts attraction force to magnetic materials.

QN 3 (b) @ ½ mark

(i) Ways of storing magnets

i/ Store magnet away from ferrous materials
ii/ Store magnet in pairs and using magnetic keeper
iii/ Store away from heat
iv/ Store away from magnetic or electric field
v/ Store away from strong vibrations or mechanical impacts.

(ii) Uses of magnet: (i) Used in speakers
(ii) Used in Ports to carry containers. 3 marks

QN 4 @(i) Density is the quantity of substance (mass) per unit volume while relative density is the ratio of the density of the substance to the density of water (1 mark)

(ii) Application of density in real life;
i/ Used in the selection of building materials
ii/ Used in designing vessels like ships, and air planes.
iii/ Used in selection of light gases in balloons
iv/ Used in identifying purification of minerals.
@ ½ mark

QN. 4(b) (i) factors affects density

i/ Temperature
ii/ Volume of a substance
iii/ Mass of a substance
iv/ Pressure.

@ ½ mark.

Qn 04 (a)(ii)

Data:

Mass of the stone (M_s) = 112.5g

Initial volume of water V_0 = 50cm³ (½ mark)

final volume of water V_1 = 95cm³

density of stone ρ_s = ?

from $\rho_s = \frac{M_s}{V_s}$ (½ mark)

but $V_s = V_1 - V_0$ (1 mark)

$\rho_s = \frac{M_s}{V_1 - V_0}$ (1 mark)

$\rho_s = \frac{112.5g}{(95-50)cm^3} = \frac{112.5g}{45cm^3}$ (1 mark)

$\rho_s = 2.5 g/cm^3$

∴ The density of stone = $2.5 g/cm^3$ (½ mark)

QN5. (a)(i) Archimede's Principle states that "When a body is totally or partially immersed in a fluid it experiences an up thrust which is equal to the weight of the fluid displaced by the body" (2 marks)

Qn 05 @(ii)

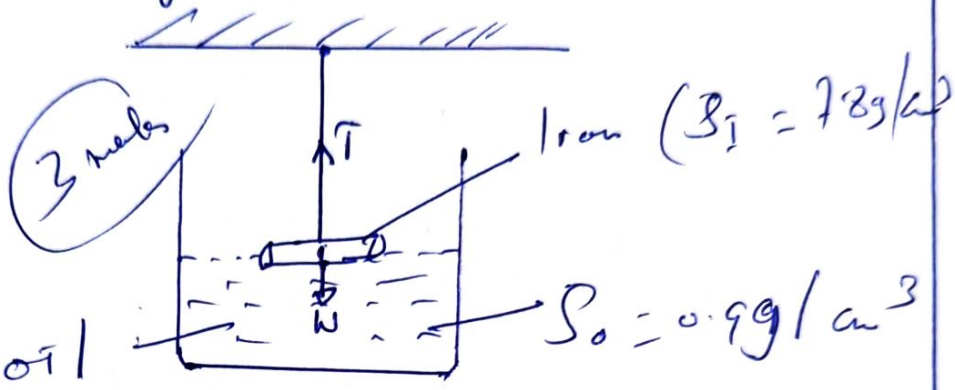
Data given: Mass of iron piece $M_i = 360\,g$

Density of iron piece $S_i = 7.8\,g/cm^3$

Density of oil $S_o = 0.9\,g/cm^3$

Tension in the string (T) = ? (1 mark)

Consider the diagram



Tension in the string = Apparent weight of iron — 1mark

Apparent weight of iron = Actual weight of iron − upthrust — 1mark

$= M_i \cdot g - S_o \cdot V_o \cdot g$

$= \left(\frac{360}{1000} kg \times 10\frac{N}{kg}\right) - 0.9 \times V_o \times 10$ — 1mark

$= 3.6N - (900 \times V_o \times 10)$

But iron piece submerged halfway

$V_o = \frac{1}{2} V_i$ — 1mark

$= \frac{1}{2} \times \frac{M_i}{S_i}$

$= \left(\frac{1}{2} \times \frac{0.36}{7800}\right) m^3$

$$V_o = 4.615 \times 10^{-3}\ m^3 \times \frac{1}{2}$$

$$V_o = 2.3 \times 10^{-3}\ m^3$$

Then:

Apparent weight of iron $= 3.6N - 900 kg/m^3 \times 2.3 \times 10^{-3} \times 10$

$= 3.6N - 8.207N$

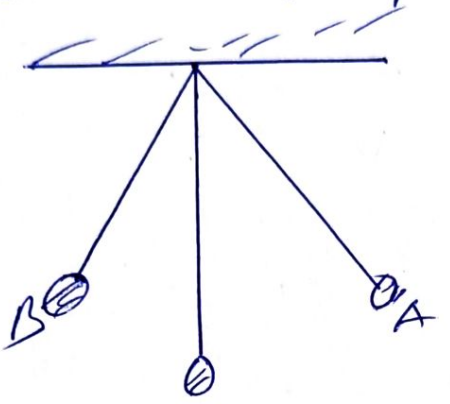
$= 3.4N$

∴ The tension in the string is $3.4N$ (1 mark)

QN 6

(a) (i) Principle of Conservation of energy states that "Energy can neither be created nor destroyed but can be transformed from one form to another. 1 mark.

(ii) Consider a simple pendulum below



3 marks

from the above diagram, when the bob is swinging from point A to point O, the potential energy is transformed to kinetic energy where at point O the kinetic energy becomes maximum, but when swing from O to B the kinetic energy is used to oscilate (move) the bob up to the point B where it becomes zero while the P.E becomes maximum. Therefore, At point A and B the P.E is maximum while at point O the P.E is zero when K.E is maximum. (4 marks)

QN. 6 (b)

i) Potential Energy is the energy possessed by the body due to its position (1 mark)

ii) Kinetic Energy is the energy possed by the body due to its motion. — 1 mark

Qn 7

@(i) Water wets glass due to its high adhesive force compare to that of mercury. (2 marks)

(ii) factors affecting capillarity (@ 1 mark)

i/ Nature of the liquid

ii/ Diameter of capillary tube

6 (i) A potter put some soft material on his/her head for a heavy load so as to increase the surface area of which results to the decrease in pressure

ie $P \propto \frac{1}{A}$ ---- (3 marks)

(ii) Characteristics of pressure in liquid

⇒ Pressure depends on depth

⇒ Pressure acts equally all direction

⇒ Pressure increase as the density of the liquid increases. (@ = 1 mark)

Qn 8

(a) (i) Radius of curvature is the distance from the pole to the centre of curvature. It is denoted by letter r (1 mark)

(ii) Focal length: Is the distance between pole and the centre of the the mirror

ie $f = \frac{r}{2}$ (1 mark)

(6)(i) ⇒ A ray of light passing parallel to the principal after reflection it passes throug the principal focus

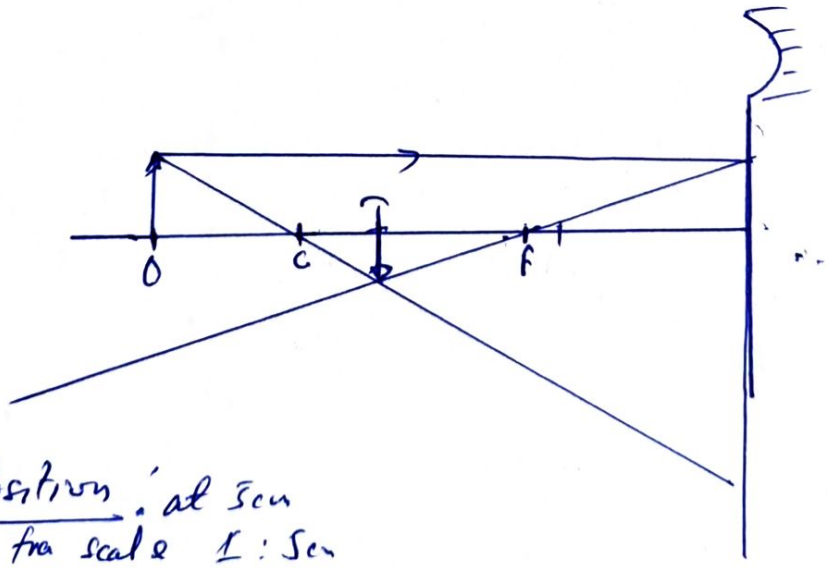
⇒ A ray of light passing through the principal focus after reflection it travel to the principal axis

⇒ A ray of light passing through the centre of curvature after reflection it passes through its own path

⇒ A ray of light which is incident at a pole of a concave mirror is reflected back making the same angle with the principal axis

@ = ½ mark

(6)(ii) Scale: 1 cm : 5 cm ... —(½ mark)



..... 3 marks

Position: at 5cm
from scale 1 : 5cm
5a : x

x = 25cm

∴ The position of the image is 25cm from the pole of the concave mirror — ½ mark

The size of the image (it is 1.3cm high)

from scale

1cm : 5cm

1.3 : x

x = 6.5cm

∴ The size of the image is 6.5cm ---- ½ mark

(iii) The nature of the Image formed

(i) Real

(ii) Virtual

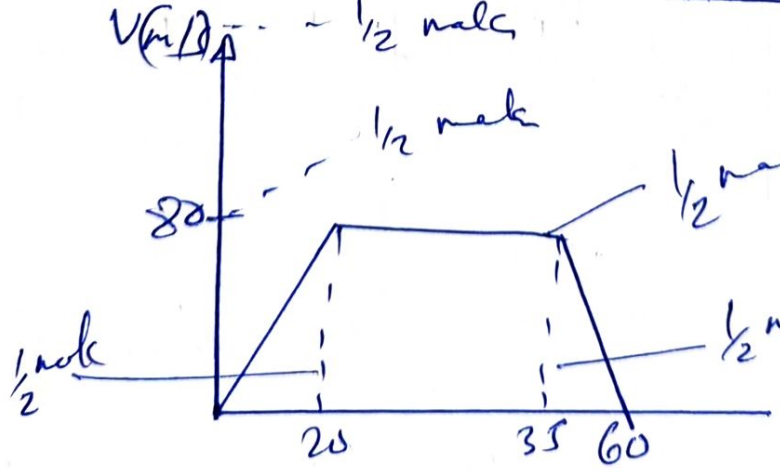
(iii) Diminished. ---- 1 mark.

ON 9

(a) (i) Uniform velocity is the a constant rate of change of displacement. ---- ½ mark

(ii) Retardation is the negative of ---- ½ mark the acceleration.

(b) (i) VELOCITY TIME GRAPH. ---- ½ mark



(ii) Total distance = Area under the graph ---- 1 mark

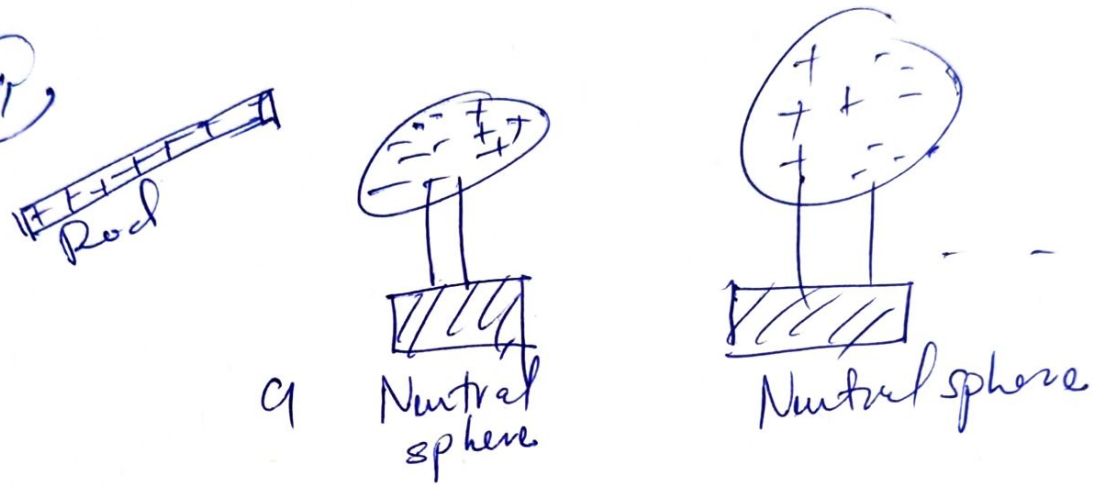
$= \frac{1}{2} \times (a+b) \times h$

$= \frac{1}{2} \times (15+60) \times 80$

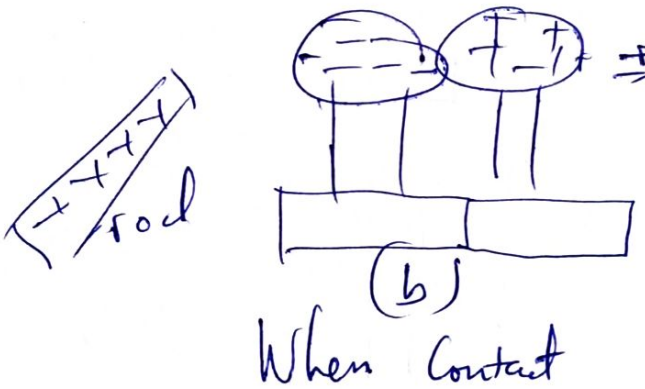
∴ Total distance = 3000 m ---- 2 mark

(b)(i) A person walking on the carpet floor his/her legs use to rub with the carpet loosing some electrons, so when touches metalic door knob eletrons shift (transfer) to the person's body to restore the lost charges. here a person feel electric shock. (2 marks)

(ii)

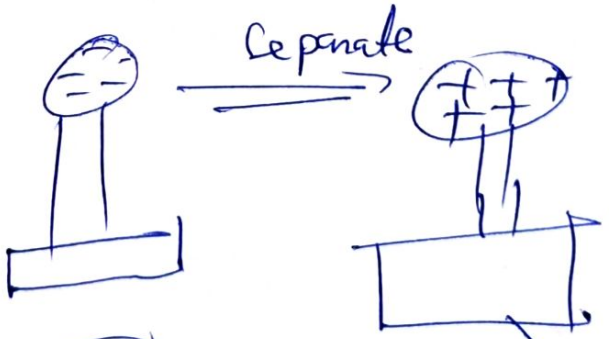


01



⇒ Negative charge move near by the positive rod and the positive move to the another sphere.

01



01

C

On separation charged sphere

iii/ acceleration $a = \frac{v-u}{t}$ ..... 1 marks

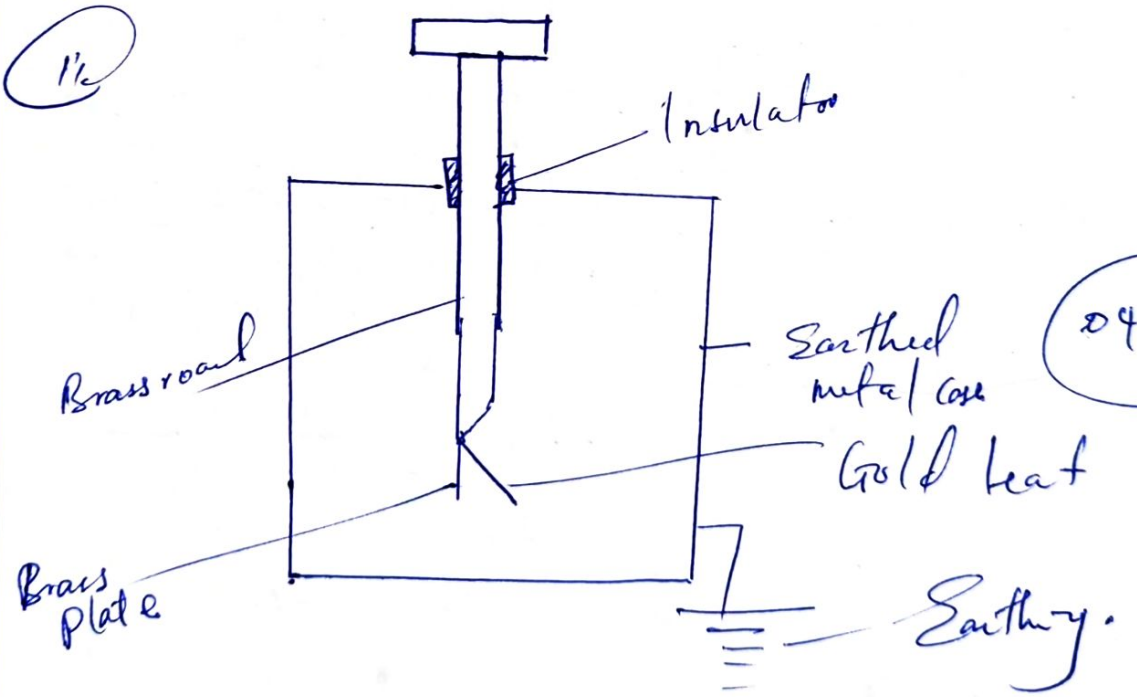
$= \frac{80-0}{20}$

$\therefore a = 4 m/s^2$ ..... 2 marks

Section C

10. (a) (i) a Gold leaf electroscope is an instrument which is used to detect the presence of electric charge in a material. ..... (01 Mark)

(ii)



04 marks

10. (c)(i) Ohm's law states that "
The current flowing through the conductor is direct proportional to the potential difference across its terminals (ends) provided temperature and the physical factors are kept constant. ---- (01 mark)

(ii) Factors affecting resistance of a conductor
i/ Temperature
ii/ Length of a wire
iii/ Cross-sectional area
iv/ Nature of a conductor. ---- (@ ½ mark)

iii/ Data given: Length (l) = 45cm
diameter (d) = 0.37mm
$r = 0.185mm = 1.85 \times 10^{-4}m$
$\rho = 4.9 \times 10^{-7} \Omega m$

From $A = \pi r^2$

$A = 3.14 \times 1.25 \times 10^{-4} \times 1.85 \times 10^{-4}$

$A = 1.075 \times 10^{-7} m^2$

But from $\rho = \frac{AR}{L} \Rightarrow R = \frac{\rho \cdot L}{A}$ ---- (1)

$R = \frac{4.9 \times 10^{-7} \Omega m \times 0.45 m}{1.075 \times 10^{-7} m^2} = 2.05\Omega$ (1)

∴ Resistance of a wire is 2.05Ω.