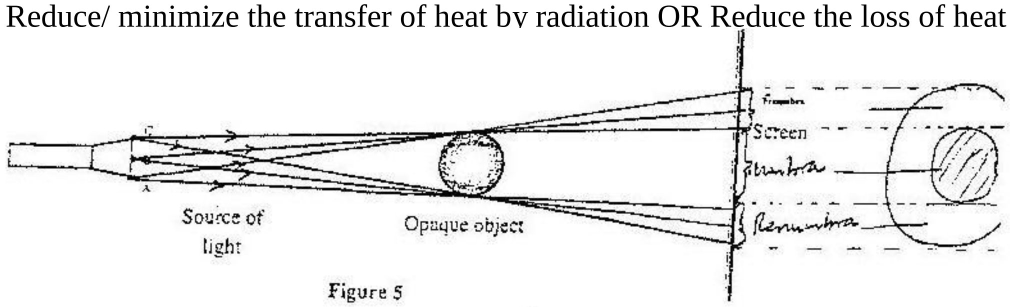
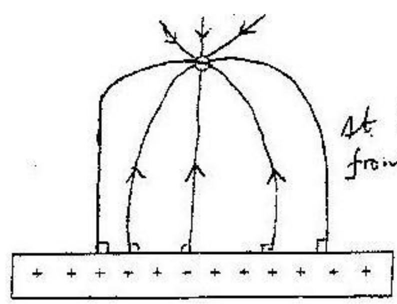
PHYSICS PAPER 232/1 K.C.S.E 2005 MARKING SCHEME

1. Volume of 55 drops =8ml accept cm^3
   Or Volume of one drop =8/55
   $= 0.1454/0.1455/0.145/0.15cm^3$
2.

3. Water in A expands reducing/lowers density
   This reduces/lowers up-thrust on block causing tipping to side A
4. There is extra/ more/higher/ increased pressure in (b) due to the wooden block increasing distance d_2
5. Reduce/ minimize the transfer of heat by radiation OR Reduce the loss of heat OR gain of heat by rad



6. 2 set of rays with arrows labeling of umbra (totally dark) and partly dark (Penumbra)
7. A or tube with air
   Gas molecules move faster/quicker than water molecules OR Diffusion of gases is faster/more than in water/Grahams law the density of air is less than that of water



At least 3 lines and direction from positive to negative.

Figure 6

8.
9. A-Positive
   B-Negative
10. C- Ammonium jelly/chloride /paste/solution/NH_4Cl
    D-Mixture of carbon and manganese (iv) oxide/MnO_2

11. In (a) cohesive forces between water molecules are greater than adhesive forces between water and wax while in (b) adhesive forces between water and glass molecules are greater than cohesive forces between water molecules. ✓

12.

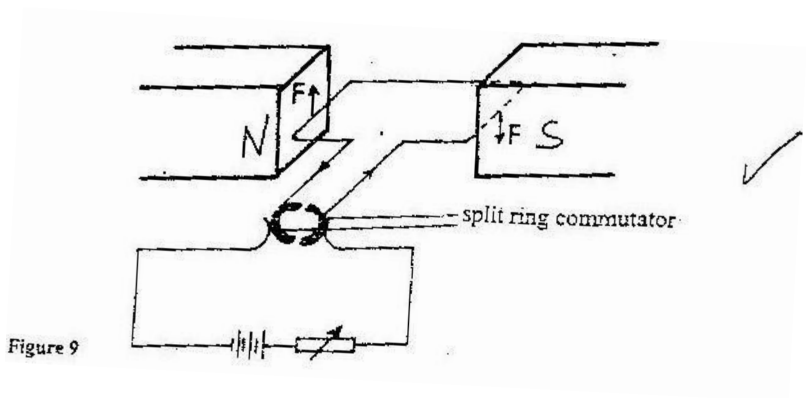


Figure 9

13. to make the rotation continuous by changing the direction in the coil every half cycle/turn also accept changing direction of the current every half cycle/turn/maintaining the direction of current in field.

14. $S=nt+{}^{1}/_{2}\ st^{2}$ where t is the time to reach the ground
$15= 0 + ½\ St^{2}$ since the initial velocity is zero and t= 3 = 1.732
Horizontal distance= Horizontal speed x t = 300x 3 o 519.62m

15. Efficiency = Ma/VR OR Ma/VRx 100%

$0.75 = \dfrac{600/400}{V.R}$

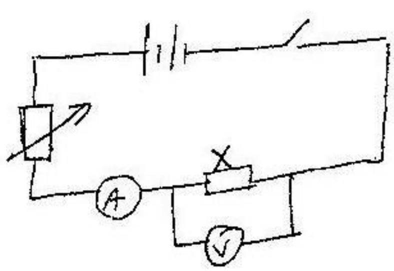
V.R = 2

ACT
M.A $^{600}/_{400}$= 1.5
$^{1.5}/_{V.R}$= 0.75
V.R=2

16. =4cm or 0.04m from the graph
V = fλ= 5 x 0.04
= 0.2ms-1 or 20cm/s

17 The pitch decreases as the siren falls
The higher the speed away from the observer, the lower the frequency heard and so the lower the pitch hard.

18. *Accept cells in parallel and other symbols of rheostats*



19 (i)

$= V^2/-R$

2500= 240 2/R

R=23.04 or (23.03)

(ii) P=IV

I P/V = 2500/240 =10.417A

V = V/I= $\frac{240/2500}{2500}$

= 23.04R (23.03)

(iii) P= IV and V=IR or I^2 R

R= $\frac{240 \times 240}{2500}$

R= 23.04R

20. The liquid is boiling

21.

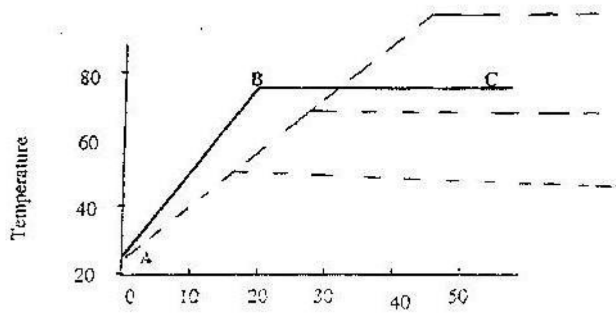
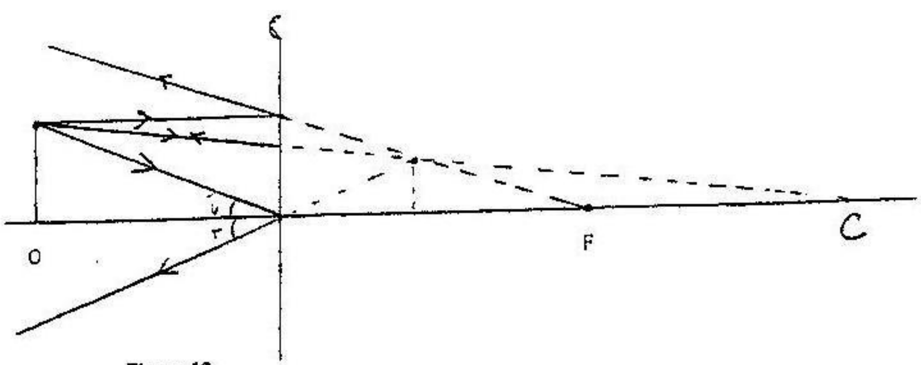


Figure 11

22.



2 Rays: Each correct ray 1 mark

ɔr.

Figure 12

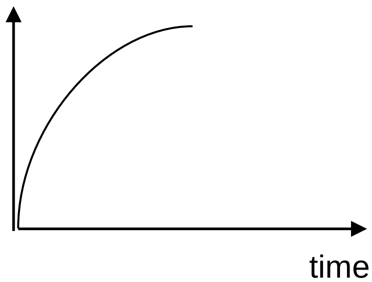
23. C=47^0-10^0 =37^0 + 7=37^0

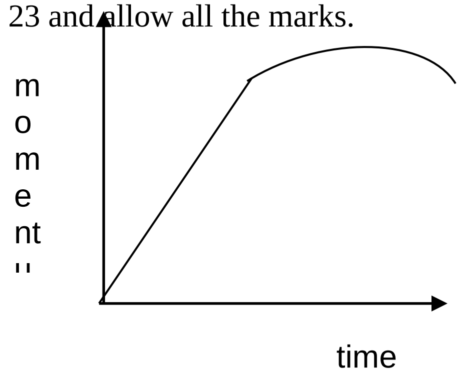
24. $n = \dfrac{i}{\text{Sin C}}$

$n = \dfrac{I}{\text{Sin } 37} = \dfrac{1}{0.6018}$

n =1.66/1.551/1.662 Allow TE from question 23 and allow all the marks.

25.



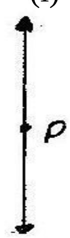


26. 1. At steady rate, the sum of pressure, the potential energy per unit volume and kinetic energy per Unit volume in fluid in a constant.
2. Provided a finish is non-viscous, incompressible and its flow steamline and increase in its velocity produces a corresponding decrease in pressure
3. When the speed of a fluid increases, the pressure in the fluid decreases and vice versa.

27. 273+ -281.3 = 8.3K (accept – 8.15 was use.)

28.

(i)



(ii)

29. (i) $F = MV^2/r$

$4800 = \dfrac{800 \times V^2}{20}$

V = 10.95m (allow 10.09 of a slide is used)

Alternatives.

(ii) $V_{max} = \sqrt{Mrg}$ but $Fr = M\mu g$

$M = \dfrac{Fr}{Mg} = \dfrac{4800}{800 \times 10}$

$= 0.6$

(iii) F = Ma

4800 – 800 x a, $a = 6m/s^2$

$A = v^2/r$

OR

$6 = V^2/20$
$V = 10.95$

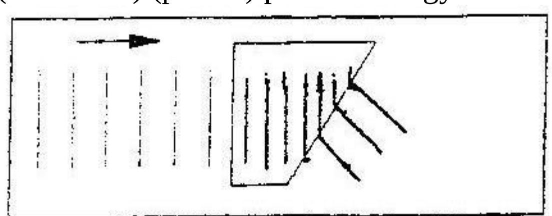
(iv) $F = MR$, $M = F/R = \frac{4800}{800} = 0.6$

$\tan \theta = 0.6$
$V^2 = rg \tan \theta$
OR
$V^2 = 20 \times 10 \times 0.6$
$V = 10.95$

30. Image changes from real to virtual
Image changes from inverted to upright
Image changes from behind lens to the same side as object.

31. In excited state the electron is in a higher (outer) energy level. As it falls back it releases energy and may fall in steps releasing different energies (radiations) (proton) packets energy.

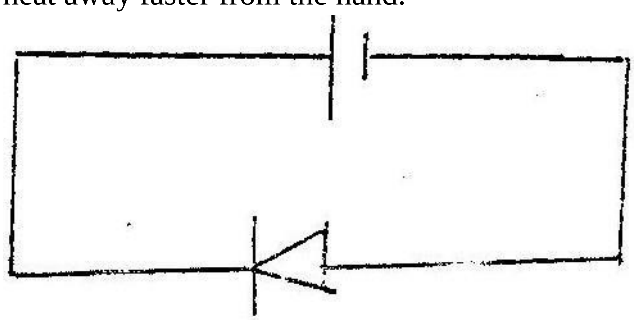
32.



33. To withstand the high temperature (immerse heat) prevent the target from melting due to high

34. Methylated spirit evaporates faster/highly volatile than water taking latent heat away faster from the hand.

35.



36. m- Alpha (∝) particle/ radiation/decay
n- Beta (β)
x- Polonium (P_o)

37. When the switch is closed and nails attracted.
When the switch is opened, the nail on the iron end drops first.

38. Conductor allows charge to be distributed/movement/spread.

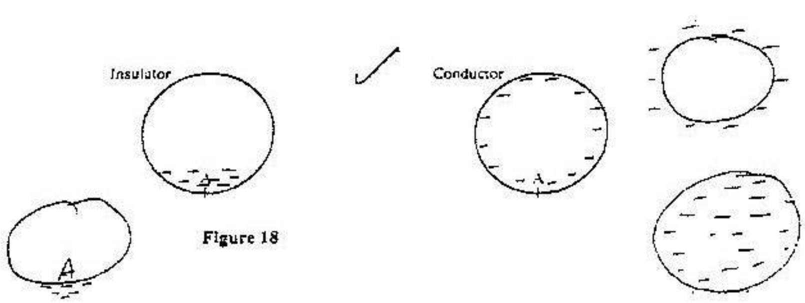
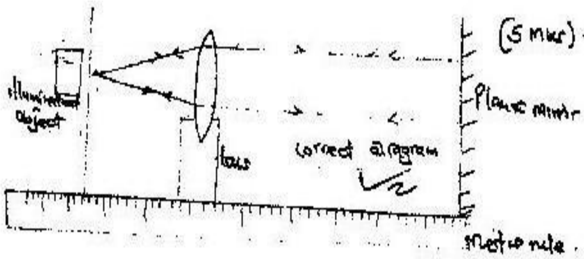


Figure 18

PHYSICS PAPER 232/2 K.C.S.E 2005 MARKING SCHEME

1.

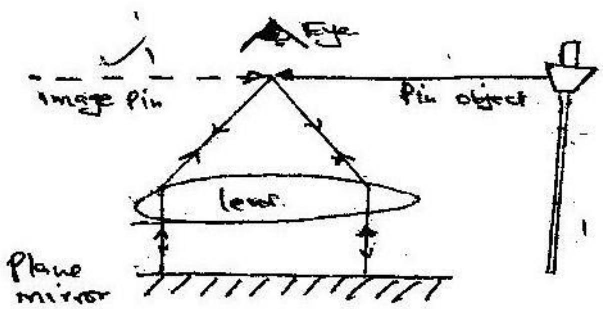


Correct diagram

With distance between lens and object being greater than facal length f;

(a) Adjust the lens distance until a sharp image of object is formed besides object
(b) Distance between the lens and the object is measured and repeated several times
(c) The average of the distance is the focal length of the lens

Alt Method: No parallax method is also marked

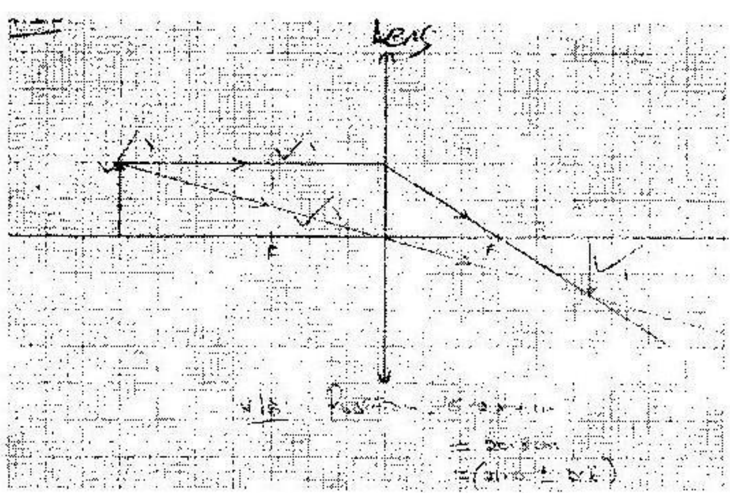


Correct rays 1 mark

Lens on plane mirror 1mark

The pin is adjusted until there is no parallax between the object pin and the pin image. The distance between the lens and pins is the focal length of the lens

(b) On the graph paper



NB: position = 5.2 x 4 cm

= 20.8 cm

$= 21 \pm 1$ cm

(c) (i) Long sightedness/ hypermetropia/ presbiopia

(ii)

2. (i) Distance traveled by the effort in one revolution = $2\pi R$

Distance traveled by load = $2\pi r$

$$\text{Velocity ratio (V.R)} = \frac{\text{effort distance}}{\text{Load distance}} = \frac{\cancel{2\pi}R}{\cancel{2\pi}r} = \frac{R}{r}$$

$$\text{Therefore V.R} = \frac{R}{r}$$

(ii) $\text{V.R} = \frac{R}{R} = \frac{8\text{cm}}{5\text{ cm}} = 1.6$

$$\text{Efficiency} = \frac{\text{M.A}}{\text{V.R}} = \frac{80}{100}$$

$$\text{But M.A} = \frac{\text{Load}}{\text{Effort}} = \frac{20\text{N}}{E}$$

$$\text{Therefore } \frac{20\text{N}}{E} \div 1.6 = 0.8$$

$$\frac{20\text{N}}{E} \times \frac{1}{1.6} = 0.8$$

$$\text{Effort } E = \frac{20\text{N}}{1.6 \times 0.8} = 15.6\ (3)\text{ N}$$

$$= 15.6\text{N}$$

(iii) When the load is large, the effect of friction and weight of the moving parts is negligible

NB friction and weight of moving parts to be mentioned

3. Total resistance $R = 6\ \Omega + 5\ \Omega + 1\ \Omega = 12\ \Omega$

Total current $1 = {}^{V}/_{R}$ Check correct substitution

(ii) P.d across each capacitor $= 1R$

$= 0.25 \times 11$

$= 2.75$v

Charge $= CV = 1.4 \times 2.75 \times 10^{-6}$

$= 3.85 \times 10^{-6}$C

4. (a) (i) Pure Silicon or germanium is doped with prevalent impurity i.e. phosphorous.

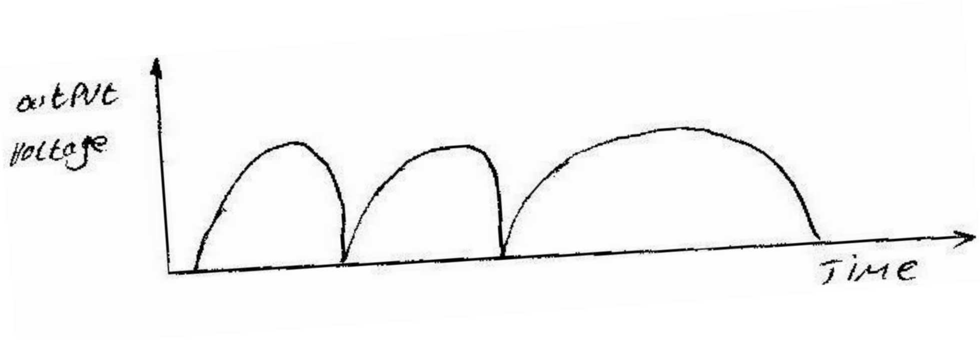
(ii) Four of the fire valence are paired with semi- conductor electrons

(iii) The fifth electron is left unpaired and so conducts

NB; Doping pairing and conducting must be mentioned

(b) (i) In the first half – cycle A is a positive making D_2 and D_3 to be forward biased, so current flows through D_2 R and D_3 to B.

In the second half – cycle, B is positive making D_4 and D_1 forward biased. The current flows through D_4 R and D_1 to A



(ii)

(iiii) The capacitor is charged when p.d is rising and stores charge

It discharges through the resistor when p.d is falling

This makes output smooth i.e reduces humps

(c) hfe $= \frac{\Delta Ic}{\Delta I_B}$

$120 = \frac{\Delta Ic}{20B/A}$

Therefore ΔIc = 120 x 20 MA = 2.4mA

Output p.d charge $= R_L \times \Delta IC$

1000R x 2.4 mA

= 2.3v

5. (a) Extension is directly proportional to the extending force provided the elastic limit is not exceeded.

(b) (i) 3.2 N or 3.3 N

(ii) At 5 cm F = 1.45N
Stress = F/A = $\frac{1.45}{0.25 \times 10^{-4} m^2}$
= 5.8×10^4 Pa

NB: can work with N/cm²
Accept 5.6 – 5.8) x 104 pa

(iii) Strain = $\frac{\text{Ext}}{\text{Original length}} = \frac{5}{200} = 0.025$

(c) ED and DC

6. Angular velocity is the ratio of angle covered (angular displacement) to the time interval

or $W = \frac{\theta_2 - \theta_1}{t_2 - t_1}$

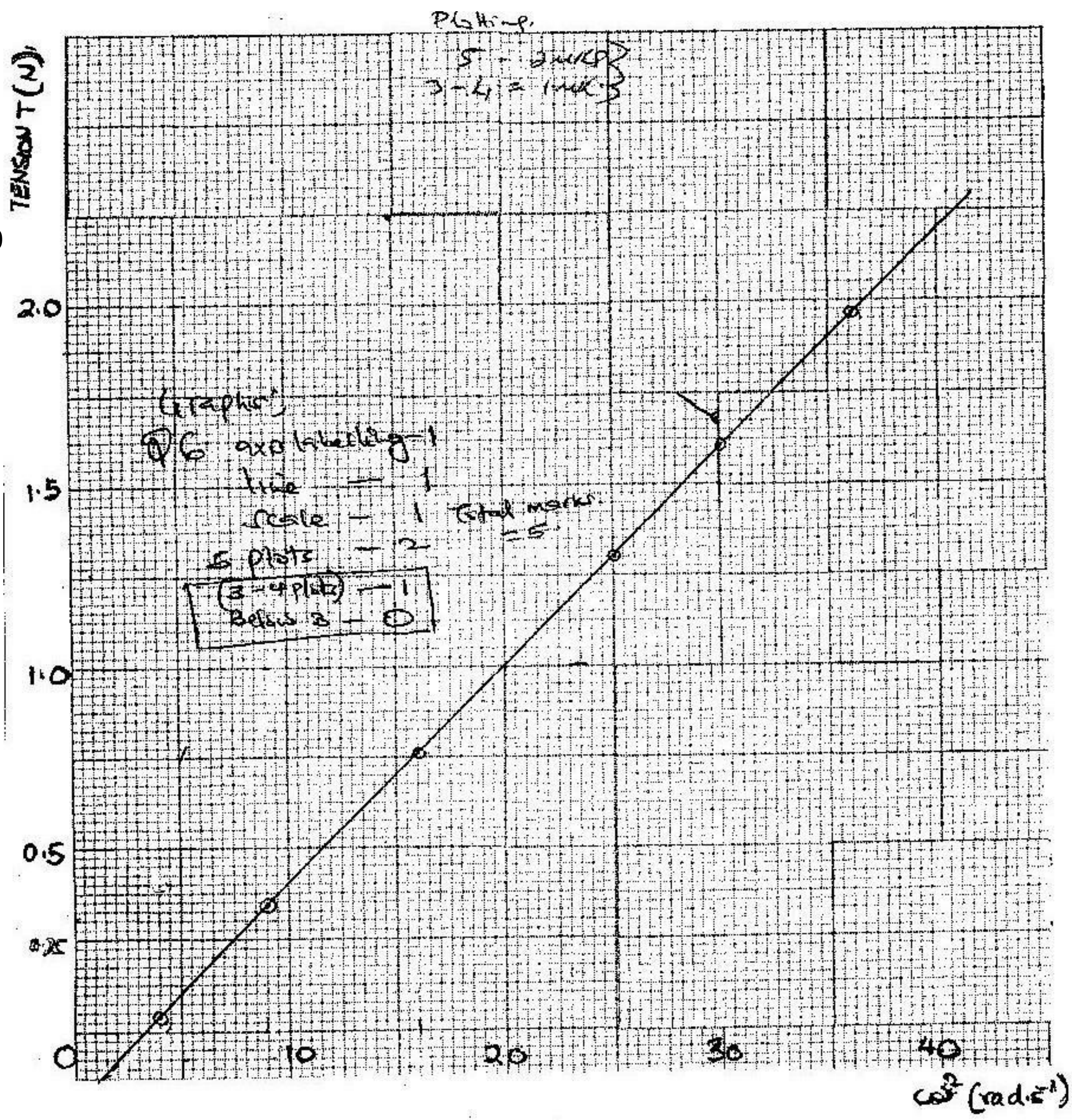
(b) w = $\underline{300 - 170}$ = 10 radis^{-1}

13

10t = 170

T = 17 sec

(c) (i)



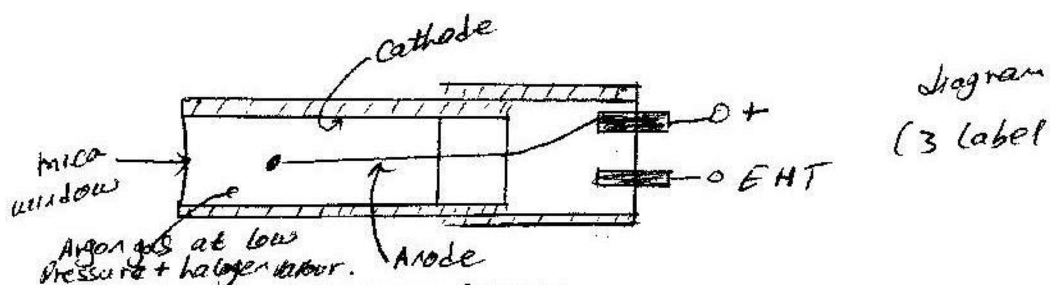
(ii) T = mco2r – C slope = mr = $\frac{1.5 - 0.25}{28.5 - 8.0}$ = 0.061

M= $\frac{0.061}{30 \times 10^{-2}}$ = 0.203 Kg (0.2 kg)

iii) Extent graph (calculate) C= 0.2

It represents frictions between table and body

7. (a)



Radioactivity is the spontaneous disintegration of unstable nuclei so as to stabilize

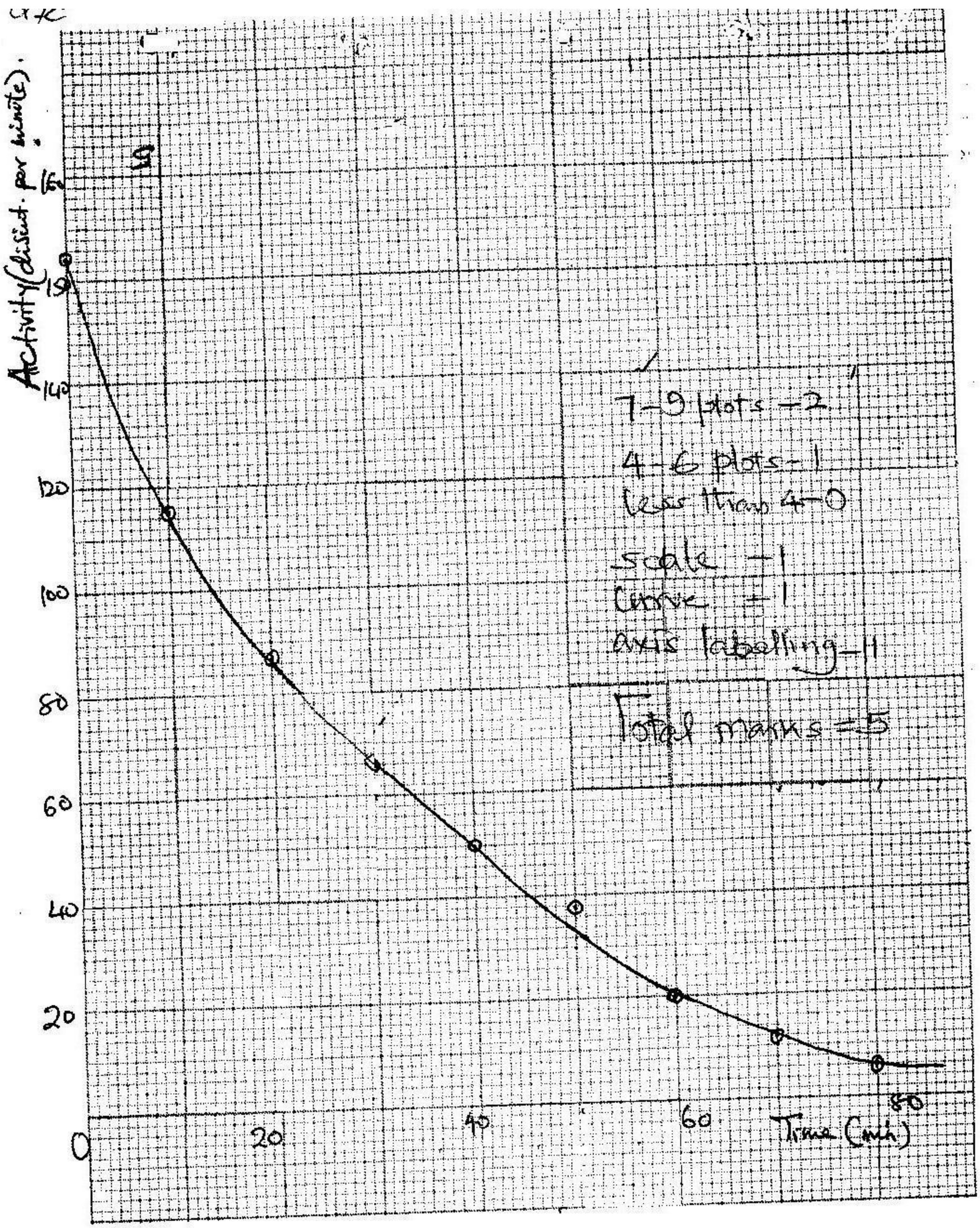
When radiation enters via mica windows, the argon gas is ionized; the electrons going to the anode and positive ions going to cathode; thus a discharge is suddenly obtained (PULSE) between anode and cathode and registered as a particle by counter. The discharge persists for a short time due to the quenching effect of halogen vapour.

(c) Half life average t ½ = 24.5 min (error transfer)

		<u>12</u>	<u>12</u>	<u>12</u>
(d) t(min	40	28	16	4
Activity	480	960	1920	3840

3 half – lives

t = 4 min


Activity (disint. per minute)
160
150
140
120
100
80
60
40
20
0
20
40
60
80
Time (min)
7-9 plots - 2
4-6 plots - 1
less than 4 - 0
scale - 1
curve - 1
axis labelling - 1
Total marks = 5