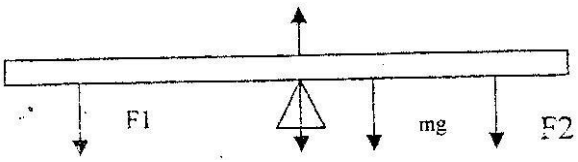
# PHYSICS PAPER 232/1 K.C.S.E 1999 MARKING SCHEME.

1. Reading on the vernier calipers
   0.5 + 0.01(5)  0.5 +0.05cm = 0.0055m/5.50mm.

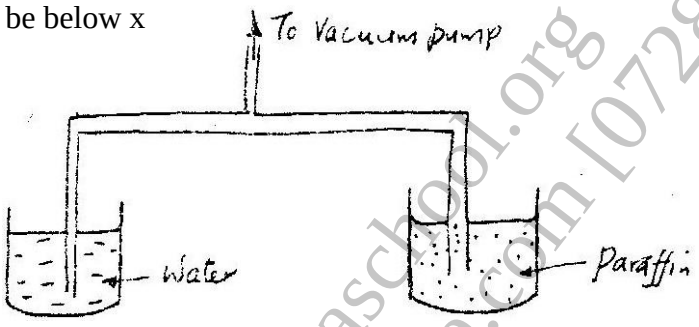
2. Third force F3 acting on the ruler is either upwards or downwards.




No: My must be at the centre.

3. Center of gravity rises when the body is tilted slightly and lowers when released / returns to original position.

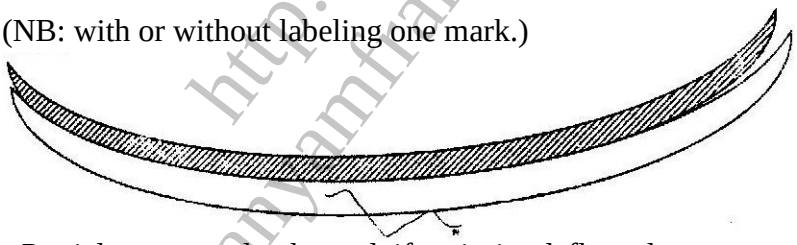
4. Y must be below x




Reason: P water is greater than paraffin = height of water required is therefore less than that of paraffin.

5. Cohesion between Hg molecules is greater than adhesion between Hg and glass molecules/cohesion force or adhesion. Force.

6. (NB: with or without labeling one mark.)



7. αParticles are + vely charged, if majority deflected most ⇒atom is empty.
   Deflection ⇒ existence of a +vely charged nucleus.
   Few deflected ⇒ nucleus is small/mass is concentrated at the centre

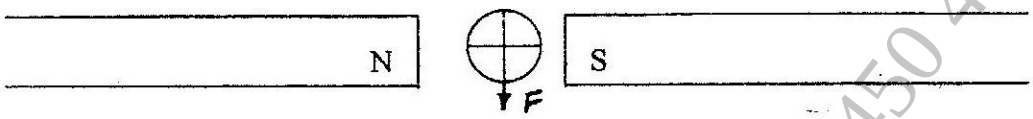
8. Angle of rotation of reflected ray=2(angle of rotation of mirror)
   $=2 \times 30 = 60^0$

9. Charge concentrate at sharp point causing heavy discharge/ ionization neutralization, leaf falls off.

10. $V = IR \Rightarrow I = {}^{V}/_{R}$  $I = 3/! = 3A$
    ${}^{1}/_{R} = 1/R1 + 1/R2 = 2/2$
    ${}^{1}/_{R} = 1 = R = 1$

11. 4mm=20N
1.5 =? F = Ke
1.5x 20 K = F = $\frac{20}{4}$ = 5 x $10^3$ N
4 e 4x $10^{-3}$
= 7.5 N F=5x $10^3$ x 1.5 x $10^{-3}$
=7.5N

12. -Dipping a magnet into a container with iron fillings, most of them will cling at the poles ⇒
- Use of plotting compass to trace.

13. 


14. Moment of couple = Force x distance between forces.
=10 x 2 = 20NM.

15. F = Ma = 70 x 0.5 F 35N
35N = 20a a = $\frac{35}{20}$ = 1.75M/$s^2$

16. P = force x velocity Power = Fd/t = $\frac{20 \times 10 \times 20}{40}$
Mg x h/t = 20x 10 x $^{20}/_{40}$ = 100j/I
= 100w

17. F = I/T = $^{1}/_{0.5}$ = $^{10}/_{5}$ = 2HZ
OR
F = No. of waves made in 1 second = 2 Hz
OR
F = $\frac{\text{No of waves}}{\text{Time}}$ = 2/1 = 2.5 / 1.25 = 2Hz

18. Beat frequency f = f2 – f1 F = f2 – f1
= 258 – 256 256 – 258
= 2Hz =/-2/ = 2

19. P = V1 = 15000 = V x 2 W = QV but Q = It e = $I^2Rt$
10 x 60 =V = W 15000 1500 = 2 x 2 x R x 60 x 10
$^{W}/_{t}$ = VI = V = 1500 Q 60 x 10 x 2 60 x 10 x 2150 = 24R
10 x 60 x 2 V = 12.5v 25 = 4R
150 V = $\frac{25}{4}$ x 2
12
12.5V V = 12.5V

20. Heat lost by substance = heat gained by water
$M_sC_s\triangle\theta_1 = M_wC_w\triangle\theta 2$
2 x 400 x 60 = $M_w$ x 4200 x 1
$M_w = \frac{2 \times 400 \times 60}{4200} = \frac{30}{7}$ = 11.4kg

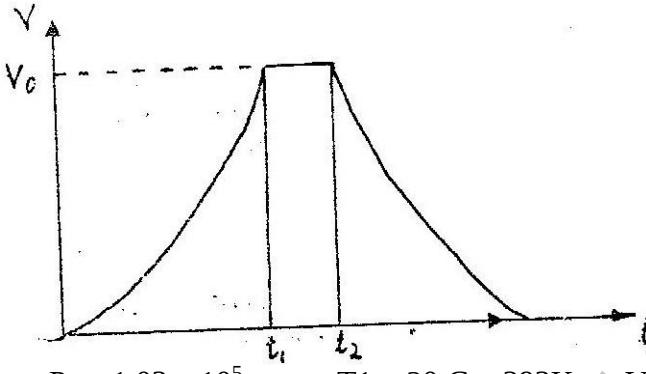
21. V = I(R +r)
5 = $\frac{10}{1000}$ (R + 50)500 ⇒ R + 50 ⇒ R = 500 - 50 = 450Ω

22. Apparent depth = 30 – 10 = 20cm $\frac{\text{real depth}}{\text{Apparent depth}} = \frac{30}{20} = 1.5$

23. Kinetic energy ray / heat energy.

24. - Horizontal acceleration is zero because g component horizontally is 0
    -Horizontal velocity remains constant
    - Resultant horizontal force is zero - resultant force is Zero.

25. $V_2$ is smaller than $V_1$ $V_1$ is larger than $V_2$

26. 


27. $P_1 = 1.03 \times 10^5$ T1 = 20:C = 393K V1 = V
    $P_2$ =? V2 = $^1/_8$V or $_V/_8$
    $P_1V_1 = P_2V_2$ $1.03 \times 10^5 - P^2/_8$ $= p^2 = 3.24 \times 10^5 N/M^2$

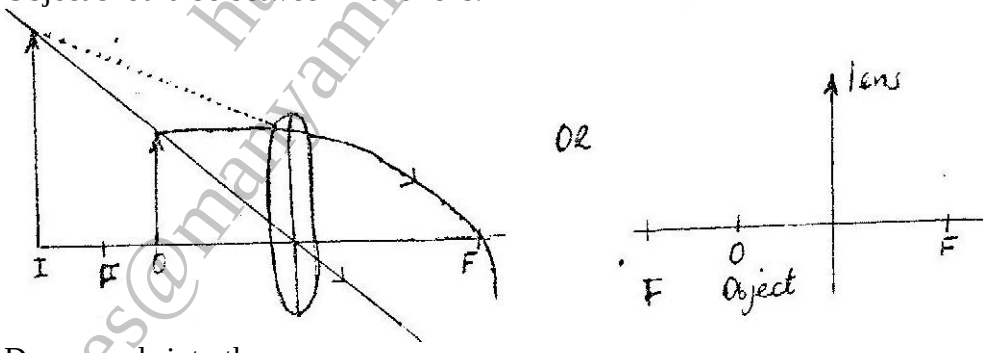
28. Radio waves, infrared, x-rays, Gamma rays.

29. Up thrust = PV x 10 = 10 PV

30. Ultra violet releases electrons from zinc plate by thermal emission.
    On removal of electrons, zinc becomes +vely charged.
    Positive charge on zinc discharges/ neutralizes the charged on the electroscope.

31. Tension = centripetal force.
    $T = Mv^2/r$ but v = wr $2 = 0.1 \times w^2 \times 0.33$
    $T = Mw^2r$ t = 0.2 x 10 = 2N $2N = Mw^2r$ 2 = 0.1 x w2 x 0.03
    $-w^2 = 2/0.003$ w $\sqrt{2000/3}$ w = $\sqrt{666.7}$ = 25.82 rads/s

32. Object should be between F and lens.




33. Downwards into the paper.

34. A-earth wire B – live wire C neutral wire

35. $Z \xrightarrow{\gamma} Z \xrightarrow{\beta} Z_{+1} +^o - 1e$

    Or Atomic number charges by / New is a head of the old or Z + 1

# PHYSICS PAPER 232/2 K.C.S.E 1999. MARKING SCHEME

1a) Longitudinal waves - direction of the disturbance while ½ .Transverse waves – direction of propagation is perpendicular to that of the disturbances.

b i) $YP - XP = 2\lambda$

ii) Dark fringes; crests and troughs arrive at the same time OK destructive interferences Bright fringes; crests arrive together at the same time OR constructive interference.

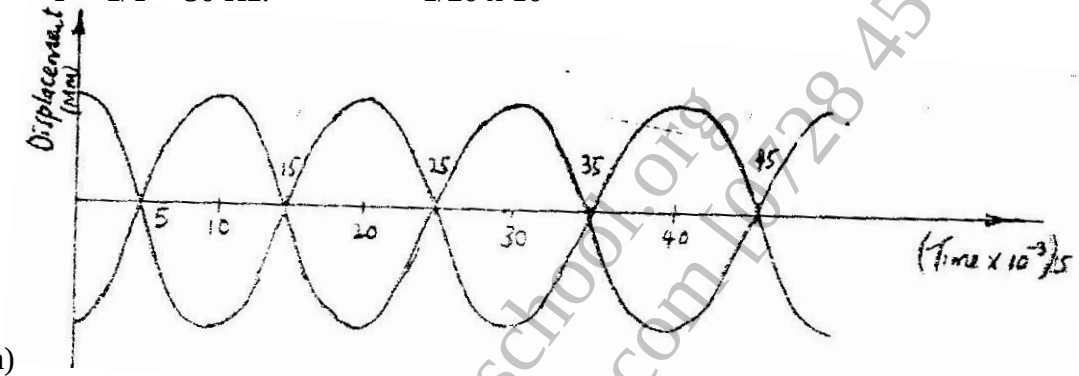
iii) No interference pattern because no diffraction takes place.

C i) $T = (2.5 - 5) \times 10 - 3$

$= 20 \times 10 - 3s\ 10^3$

$F = 1/T = 50$ Hz. $1/20 \times 10^{-3}$

ii)




2.a)

3i) Average velocity at intervals AB and CD.

$T = 1/50 \times 56$ $V_{AB} = 1.5cm/0.1s$ $V_{CD} = 3.2cm/0.1s$

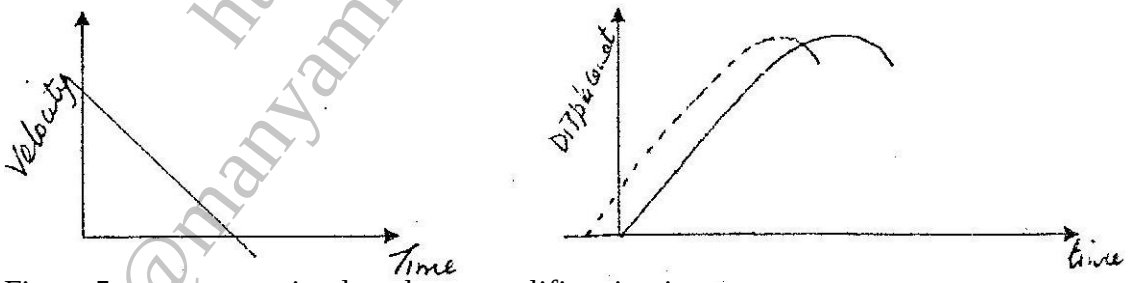
$= 0.1s$ $15cm/s$ $32cm/s$

ii) Average acceleration of the trolley.

(b) $V2 = U2 + 2gh$ $mgh = 1/2MV2$

$V = \sqrt{2gh}$ $V = \sqrt{2gh}$

ci)




4a) Figure 5 represents a simple voltage amplifier circuit.

b i) Base current.

$$\text{Current gain} = \frac{\text{Collector current}}{\text{Base current}} \qquad p2 = 1_a/I_b$$

$$\frac{62.5 = 2.5 \times 10\text{-}3}{I_b}$$

$$\frac{Ib = 2.5 \times 10\text{-}3 = 40uA}{62.5} \qquad (4x10\text{-}5)A$$

ii) Load resistance, $R_L$ — $IcRL = Vcc = 5.5$

P.d across $R_L$ — $RL = \frac{5.5}{2.5 \times 10^{-3}} = 2.2k\Omega$

$10 - 4.5 = 5.5 \quad ICRL = 5.5$

$RL = \frac{5.5}{2.5 \times 10^{-3}}$

5a) Ammeter reading decreases.

The resistance of metals decreases with increase in temperature.

i) $P = \frac{V^2}{R} = \frac{(240)^2}{100} \quad P = 576w$

ii) $P = VI$

$I = \frac{P}{V} = \frac{576}{240} = 2.4A$

## SECTION II

6a) Benzene sinks in liquid benzene.

Water increases in volume on solidifying while benzene reduces in volume; ice is less dense that liquid water. Solid benzene is denser that liquid benzene.

b i) Weigh the metal block in air and in water

Fill the overflow can in water and place on a bench / diagram

Collect the overflow in the beaker and weigh

Compare difference in weight of metal block and weight of overflow

Repeat

Up thrust = tension + weight

= (0.5 + 2.0) = 2.5N

Weight of H2O) = 2.5N

$\frac{M_w}{V_w} = 1000$

Vw = 0.25 volume of wood

$1000$

Density of wood = $\frac{0.2}{0.25/100}$

$\frac{0.2 \times 1000}{25}$

800kg/m3

alternative

Up thrust = 2.5N

$R.D = \frac{\text{Wt. in air}}{\text{Upthrust}} = \frac{2.0}{2.5} = 0.8$

€wood

€wood

€wood

c i) Time taken for half of the radio acute material to disintegrate.

ii) Correct readings for 60 and 30 time 25 + 2 minutes