PHYSICS PAPER 232 /1 K.C.S.E 2001 MARKING SCHEME

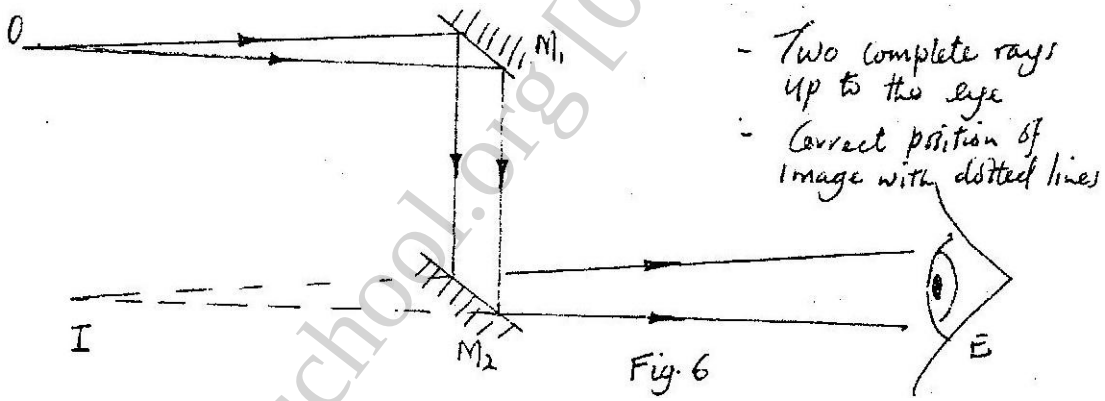
1. Volume removed = 11.5cm3
   Density = $\frac{\text{mass}}{\text{Volume}} = \frac{22}{11.5}$ $1.9cm^{-3}$
2. Weight on side A has bigger volume when water is added.
3. Centre of gravity of A is at (geometric) centre while that of B is lower when rolled. Centre of gravity of A stays in one position while that of B tends to be raised resisting motion as it resists; thus slowing down B. OR B there is friction force between the surfaces which resists motion.
4. No air on moon surface / no air pressure / no atmosphere.
5. When the permanganate dissolves / or breaks up into particles (molecules) these diffuse through the water molecules
6. When rises up the tube into the flask or water is sucked into the tube or bubbles are seen momentally.
7. Cold water causes air in the flask to contract // reduces pressure inside flask or when cold water is poured it causes a decrease in volume of air the flask or pressure increases in the flask // volume of the flask decreases.
8. 

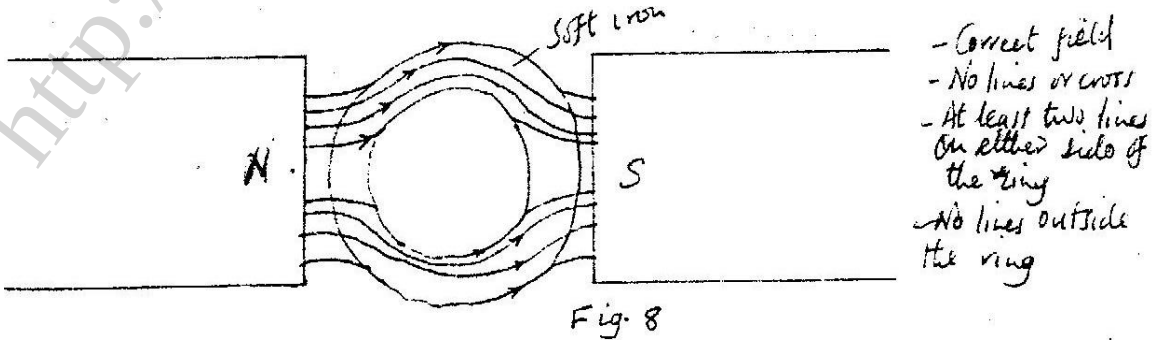
Fig. 6
9. Point action takes place at sharp points (A , B, C, D), charge concentrates at sharp points causing high pd, this causes air the surrounding to be ionized. The positive ions are repelled causing points to move in opposite direction.
10. By forming hydrogen layer / cover or hydrogen atoms or molecules which insulate the copper plate OR forming it cells between hydrogen and zinc which opposes the zinc copper cell or by forming a hydrogen layer / cover which increases internal resistance.
11. 

Fig. 8

12. F_2 F_3 or F_1 and F_4

13. Moment of a couple = one force x distance between the two forces.
Distance between F_1 and F_4 = 0.8sin 30°. Moment = 0.8sin 30° x 100 =10NM
Alternative (F_2 and F_3) Moment = f x 1M = 60N x1M = 60nM(or J)

14. $V2 - U2 = 2aS$ OR $S = \left(\frac{v+u}{2}\ t\right)$
$1502 - 3002 = 2a\ (0.5)$
$a = -67,500ms^{-2}$ $0.5 = \left(\frac{300 + 150/t}{2}\right)$ V = 150m/s u = 300m/s s = 0.5
or deceleration = $67,500ms^{-2}$ t = 1/450s

$$a = \frac{v - u}{t} = \frac{150 - 300}{1/450} = -667,500m/s^2$$

15. Efficiency = $\frac{\text{work done by machine x 100}}{\text{Work done on machine}}$ $E = \frac{\text{work out x 100}}{\text{Work input}}$

; Work done on machine (work input) = 550,000j.

16.

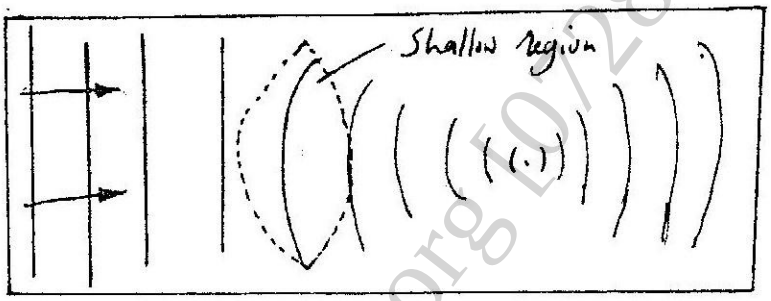


Fig. 10

17. $R = V/I = 1.5 / 0.1 = 15'\Omega$
$R = 15'\Omega - 12'\Omega = 3'\Omega$
OR $E = 1(R + r)$
$1.5 = 0.1\ (12 + r) = 1.5 = 1.2 + 0.1r$
$0.3 = 0.1e =$ $r = 0.3/0.1'\Omega$
$R = 3'\Omega$.

18. Current in heater = $\frac{p}{V} = \frac{3000}{240} = 12.5A$
Fuse not suitable since current exceed the fuse value.

19. Heat loss will be higher in A
Methylated spirit will boil faster / evaporates / more volatile causing loss of heat through latent heat of vaporization.

20.

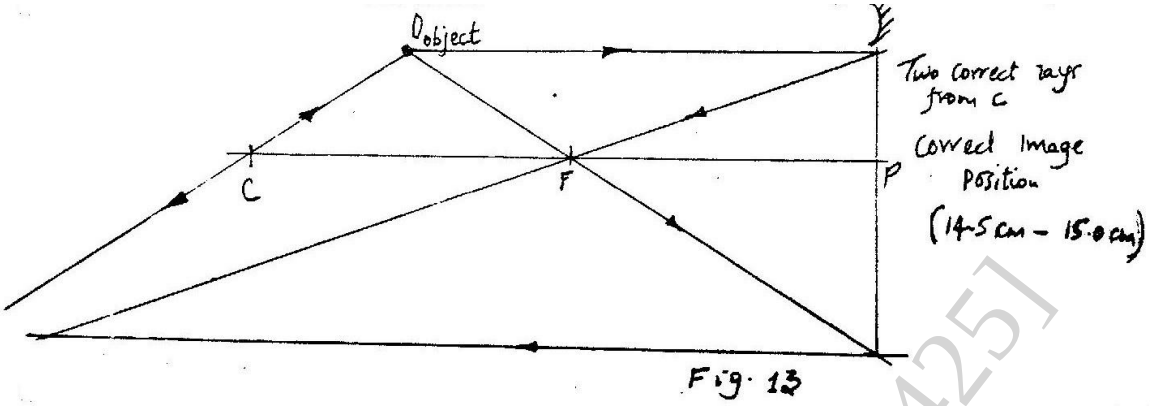


Fig. 13

21.

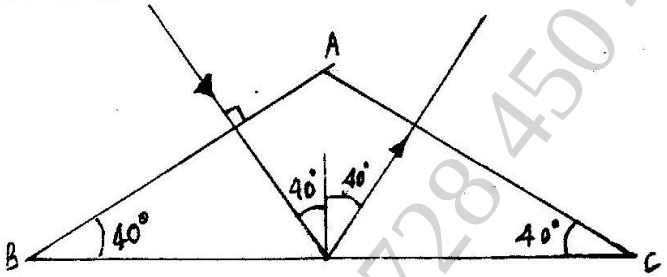
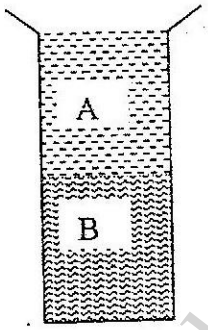


Fig. 14

22.



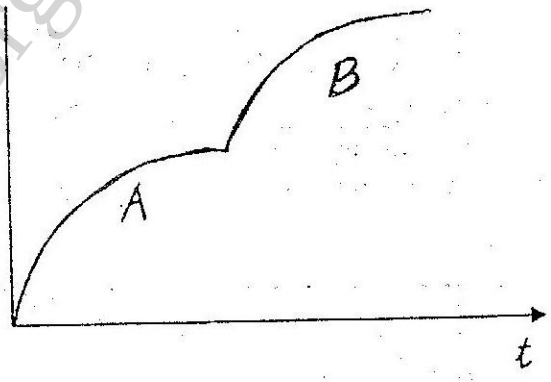


Fig. 15

23.

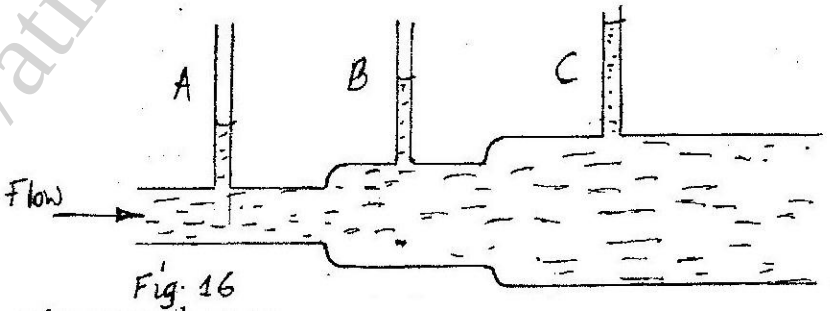
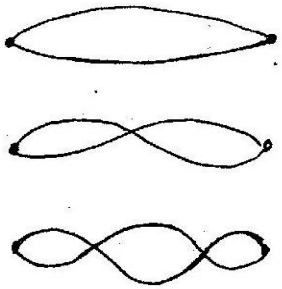


Fig. 16

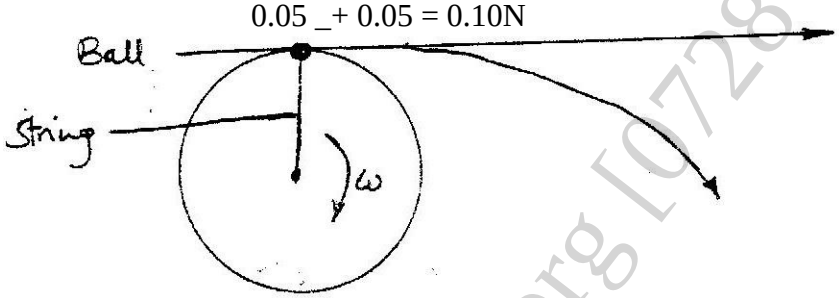
24. Since masses are the same, there are more hydrogen molecules than oxygen molecules/more collision in B than in A and hence more pressure in B. Collision in B is higher than in A.

25. 

26. Fh = f1 – f2 OR Fh = f1 – f2
Fh = 6 – 4 = 6.25Hz – 4Hz
Fh = 2 =2.25Hz.

27. Longer radio waves are easily diffracted around hills/ radio waves undergo diffraction easily.

28. Tension in A = 1.05N – 1.0N = 0.05N
Tension in B = tension due to A + Tension due to B
0.05 _+ 0.05 = 0.10N

29. 

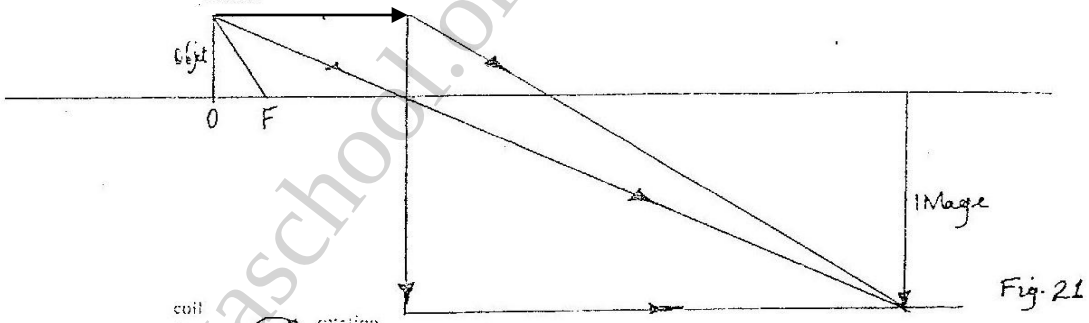
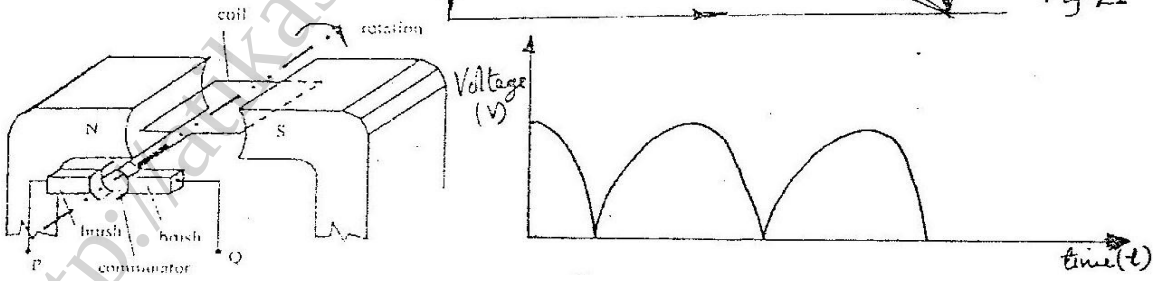
30. 

Fig. 21

31. 

32. E = pt = 60 x 30 x 60 x 60J E = 60/1000 kW x 36hrs
In kWh = $\frac{60 \times 36 + 60 \times 60 \text{ J}}{1000 \times 60 \times 60}$ E = 0.06 x 36
= 2.16 Wh E = 2.16kWh

33. Pd across Anode – cathode Or anode potential (voltage)

34. r - β (Beta)or ie B = 82 C = 206

PHYSICS PAPER 232/2 K.C.S.E 2001. MARKING SCHEME

1. Let final temperature be T
Heating gained by melted ice MCT = 0.040 x 340,000J
Heat lost by water. = MCθ 0.040 x 4200 x (20-T) J
Heat gained = Heat lost
13600J + 168 TJ = 1680 (20-T)J T= 10.8^0C

2 a i) So as to have opposite polarity on the poles.
ii) since the current is varying with time; it causes the current in the solenoid to vary, with time causing the diaphragm to vibrate this vibration is at the frequency of speech; hence reproducing speech.
iii) No vibration/receiver does not work, steel core pieces would become permanent magnet/so force of attraction would not be affected by variation in speech current.

b) $\frac{N_p}{N_s} = \frac{V_p}{V_s}$ $V_s = \frac{240}{400} \times 20 = 12v$

$V_s = V/R = 12/50 = 0.24$ A
I_s Peak = 0.24A x 2
=0.34A

3. a) Fill tray with water to the brim and level on bench; sprinkle lycopodium powder on the water surface either pick an oil drop with kinked wire; and measure the volume of a drop; put one drop at centre of the tray let oil spread and measure maximum diameter d of the patch; hence reproducing speech.
b) Hydrogen since its less dense it diffuses faster.
c) p= pgh; Or mass = D x V
= 1000 x 2x10 = 1000x 2x/1000
1-p△
= 100x 10 x 10 x 2x2 x$1o^{-4}$ = 0.4kg
= 4N = 0.4 x 10 =4N

4. i) Filament heats up cathodes; causing electrons to boil off the cathode.
ii) Grid controls brightness of spot since it is negatively charged it repels the electrons reducing number of electrons
iii) A vertical line would appear/spot oscillates vertically
iv) Deflection in TV is by magnetic fields.
v) Magnetic field produces greater deflection on electrons beam allowing wider screen.

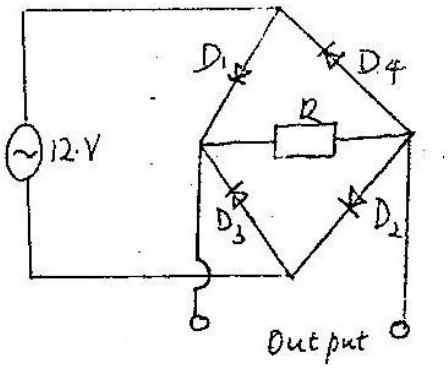
b) Energy released $\triangle E = E_f - E_i = 5.44 \times 10^{-19}j = 4.08^{-19}j$

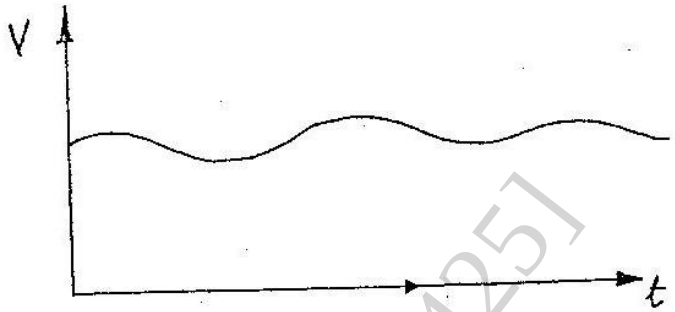
$\triangle E = hf = h\frac{C}{\lambda}$

$\lambda = \frac{6.63 \times 10^{-34} \times 3.0 \times 10^8 m}{4.08 \times 10^{-19}}$

= 4.88 x 10-7 m (4.87 – 4.90)

5a)





bi) IE = IC + IB
100 + 0.5
= 100.5mA

(ii) $\beta = Ic / IB = \frac{100}{0.5} = 200$

SECTION II.

6 a i) A body at rest or in motion at constant velocity stays in that state unless acted on by an unbalanced force; the rate of change of momentum of a body is directly proportional to the force acting on the body(F = ma) for every action, there is and equal and opposite reaction: any one for;

(ii)

$V^2(M^2/s^2)$	0.04	0.16	0.36	0.64	1.00	1.44

Graph – see graph papers
Scale
Line - 4 point

Axis – labels
Plot – 5.56 point
Slope = $\frac{1.24 - 0.100}{0.210 - 0.016} = 5.88 + 0.27$

b) V2 + u2 = 2as
When $\mu = 0$
V2 = 2 x 0.5 x 100
Momentum = mv = 200 x 1000 x (2x 0.5 x 100)
2.0×10^6 kgs^{-1}
OR $S = \frac{1}{2} at^2$
T = 100 x 2
T = 20 sec
F = ma
- 200 x 1000 x 0.5 = 10^6

Momentum p = Ft

7 a i) The pressure of a fixed mass of an ideal gas is directly proportional to the absolute temperature provided the volume is held constant.

ii)

$I/V(m^3)$	40.0	5	58.8	71.4	83.3	90.9

Graph – see graph paper
Scale
Line – 4 points
Axis – labels
Plot – 5 – 6 points

Slope $\frac{4.24 - 2.00}{86 - 40} \times 105$

$= 4.87 \times 10^3 \text{ paM}^3$

$= 4.94 \pm 0.65$

Slope $= 4.94 \pm 0.65$

Slope $= 2RT$

$R = \frac{4.87 \times 10^3}{2 \times 300}$

$= 8.12 \text{NM/K or JK}$

$= 8.23 \pm 0.11$

b) P1 = P2

T1 = T2

T1 = 12 + 272 = 285

T2 = 88 + 273 = 361

$P2 = \frac{1.0 \times 105 \times 361}{285}$

I/P x 10^5 (pa -1)	0.5	0.40	0.33	0.29	0.25	0.22

Y = intercept = 3.8 Log 600R

600r = 6309.57

R = 10.5 + 5.0