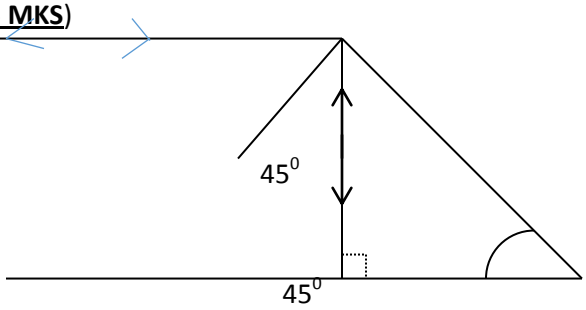
2018- PHYSICS PP2 MARKING SCHEME.

SECTION A (25 MKS)

1.



- 1 mk for showing all rays
- 1 mk for angles shown

2. The conductor is initially attracted because of opposite charge. It is then neutralized and charged positive/negative, hence repelled

3. The suspended bar magnet is repelled. The soft iron bar is magnetized and end B becomes the North pole hence like poles repel.

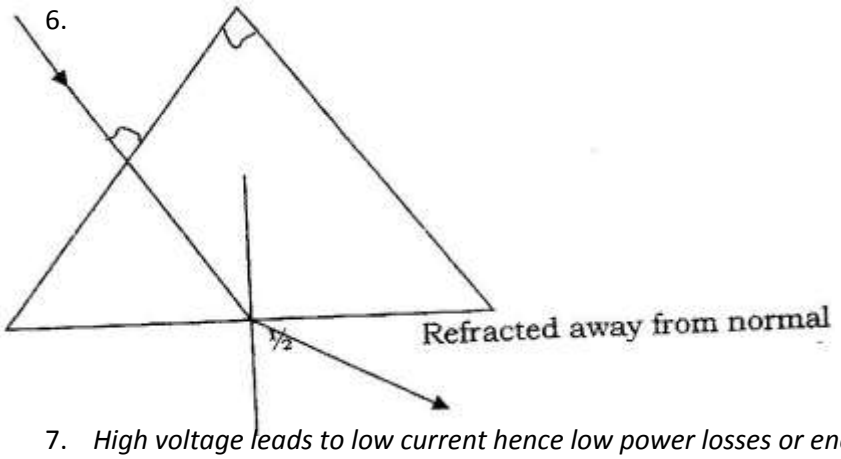
4. *Radio waves* *microwaves* *yellow light* *gamma rays*

5. $P = {}^{V2}/_{R}$ $P = {}^{220\wedge 2}/_{240\wedge 2/100}$

$R = \frac{240^2}{100}$

$= 84$ J/S

6.



7. *High voltage leads to low current hence low power losses or energy loss*

8. ${}^{2d}/_{05} = {}^{2d}/_{0.6} + 34$

D = 17/0.2 = 85 m

Speed = $\frac{2 \times 86}{0.5}$

= 340m/s

OR $V = {}^{d}/_{t}$

$= \frac{17 \times 2}{0.1}$

= 340 m/s

9. (i) Long sightedness/ hypermetropia
   ii) corrected using a convex/ converging lens; check rays converged at retina.

10.

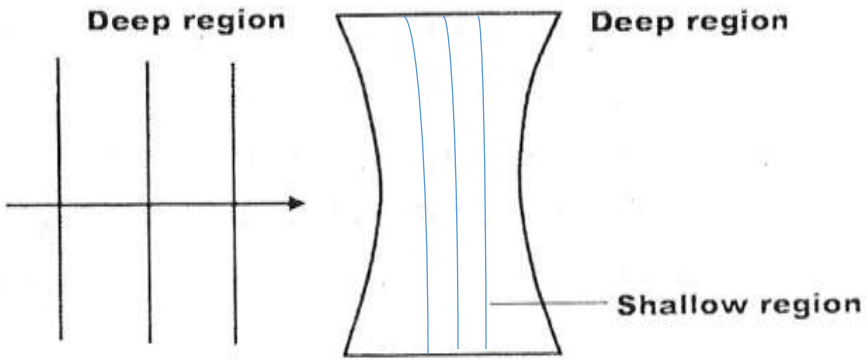


Figure 3

11. Spot moves up and down

12. Polarisation reduces current by production of hydrogen bubbles around the negative plate; can be reduced by adding a depolarizer e.g manganese (iv) oxide

13. A – Carbon brush (reject brushes)
    B - split ring/ commutator

SECTION B

14. (a) The ratio of the pd across the ends of a metal conductor to the current passing through it is a constant (conditions must be given)

    (b) (i) It does not obey Ohm's law; because the current – voltage graph is not linear through line origin / directly proportionate

    (i) Resistance = $^{V}/_{I}$ = inverse of slope; gradient = $\frac{\Delta I}{\Delta V}$

    = (0.74 – 0.70) V

    (80 – 50) mA

    = $\underline{0.4V}$

    30×10^{-3} A

    = 1.33Ω

    1.20 – 1.45 Ω (range) (3 mks)

(iii) From the graph current flowing when pd is 0.70 is 60.MA

Pd across R = 6.0 – 0.7 = 5.3v

R = 5.3 V

36mA

= 147Ω

= 139.5 – 151. 4Ω (3 mks)

(c) Parallel circuit 1/30 + 1/20 = 5/60 or 60/50

R = 12 Ω

Total resistance = 10 + 12 = 22Ω (2 mks)

(ii) $I = {}^{V}/_{R} = {}^{2.1}/_{22} = 0.095A$ (1 mk)]

(iii) V = IR = 10 x $\frac{2.1}{22}$

= 0.95 V

15. (a) (i) 3cm;

(ii) $T = {}^{0.8}/_{2}$

= 0.4seconds;

(iii) $f = {}^{1}/_{T}$;

$= {}^{1}/_{0.4}$

= 2.5Hz;

(iv) $V = f\lambda$;

$\lambda = {}^{V}/_{f}$

= 4/2.5 ;

= 1.6m/s ;

(b) i) sound waves are longitudinal in nature while radio waves are transverse in nature.

II) i) bright fringes are observed

ii) louder sound is heard

16. (a) (i) Current falls off to zero / falling to zero / deflects to max. Then zero

Reducing gradually or after sometime.

(ii)Current flows when the capacitor is charging

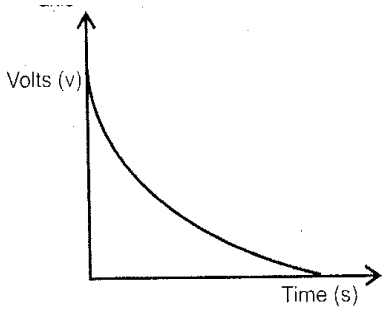
When fully charged current stops (no current) and p.d is equal to

charging voltage

(b) $V_R = 0$ V

$V_C = 5$V

(c)



Touch both axis, award for no labeled axis

(d) (i) $\frac{1}{C_s} = \frac{1}{4} + \frac{1}{5} = \frac{5+4}{20} = {}^{9}/_{20}$

$C_S = \frac{20}{9}$✓1

$C_1 = \frac{20}{9} + 3$✓1 = 5.22 μF✓1

Accept 5.22μF only

(ii) Change on series section = Q = Cv✓1

$= \frac{20}{9}$ x 10✓1μC

= 22.2μC or

Q series = $Q_T - Q_{3\mu F}$✓1

= (5.22 – 3) x 10✓μC1

= 22.2✓μC1

17. (a) Flux growing/ linking

No flux change

Flux collapsing

Switch closed: Flux in the coil grows and links the other coil inducing an

E.M.F

Current steady: No flux change hence induced E.M.F

Switch opened: Flux collapses in the R.H.S coil inducing current in opposite direction

(b) (i) $V_P = N_P$ $P = I_sV_s$

$V_s = N_s$ $I_s = \frac{800}{40}$

$\frac{400}{Vs} = \frac{200}{200}$

Vs = 40 Volts = 20A

(ii) P_p P_s

$800 = 400\ I_p$

$I_p = \frac{800}{400}$

$= 2A$

(c) Reduces losses due to hysteresis (or magnetic losses)

Because the domain in soft- iron respond quickly to change in magnetic (or have low reluctance) i.e easily magnetized and demagnetized.

18. (a) At $\frac{1}{u}$ intercept, $\frac{1}{v} = 2.5 \times 10^{-2}\ cm^{-1}$ ✓1

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$= 2.5 \times 10^{-2}$

$\therefore f = \frac{1}{2.5} \times 10^{-2}$ ✓1 $\frac{1}{0.025} = 40cm$ ✓1

b) i) Adjust the position of the lens until a sharp image of the flame is observed ✓1

- Record the object distance (u) and the image distance (V)
- Repeat with different object positions ✓1
- Use the relation $f = \frac{uv}{u+v}$ to determine f ✓1

ii) Diverging lens produces a virtual image which cannot ✓1 be formed on a screen