Physics (042)

2

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SECTION - A .

(B) becomes greater than C

(A) $\frac{\alpha}{r}$

(D) $\frac{4R}{3}$.

(B) 5 cm

(C) 0.196 Am^2.

(D) 69 V

(A) Infrared rays

(B) $[M^0 L^2 T^{-2}]$

(A) x - rays

$\frac{A\varepsilon_0}{\frac{x}{K} + \frac{d-x}{\infty}} = \frac{A\varepsilon_0 K}{x}$, $d > x$

$C = \frac{A\varepsilon_0}{d}$.

N I A.

$\frac{10}{\pi} \times \pi \times \left(\frac{14}{100}\right)^2$ $|E| = \frac{\alpha}{r^2} \hat{r}$.

$dE = -\frac{dV}{dx}$.

$\frac{10 \times 196}{100 \; 100}$

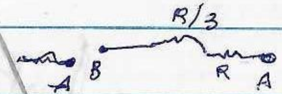
$=$

$-\int_{\infty}^{x} \frac{\alpha \, dr}{r^2} = \left(\frac{\alpha}{r}\right)_{x}^{\infty}$

$= 0 - \frac{\alpha}{x}$.

16 t + 5

64 + 5.



$q \, 10^4 = \frac{1}{2} m \, 10^{12}$.

$c^2 = \frac{1}{\mu\varepsilon}$

$\frac{q}{m} = \frac{1}{2} \times 10^8$.

LT^{-1}

$r = \frac{mv}{qB} = \frac{2 \times 10^{-8} \times 10^6}{4 \times 10^{-1}}$

$mv = \frac{h}{\lambda}$ 11

$= 0.5 \times 10^{-1}$

$= 0.05 \, m$

Space for writing Question Number

(A) f_o and f_e small, and $f_e > f_o$

(B) 0 and $4a^2$

(C) $\frac{1}{4}$.

13. (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

14. (C) Assertion (A) is true, but Reason (R) is false.

15. (D) Both Assertion (A) and Reason (R) are false.

16. (C) Assertion (A) is true, but Reason (R) is false.

$2a$.

$0, 4a^2$.

$\sqrt{2mKE} = \frac{h}{\lambda}$

$\frac{\lambda_\alpha}{\lambda_p} = \frac{\sqrt{m_p (KE)_p}}{\sqrt{m_\alpha (KE)_\alpha}}$

$= \sqrt{\frac{1}{4}} \cdot \sqrt{\frac{1}{4}} = \frac{1}{4}$.

Space for writing Question Number

SECTION - B.

17. ν_0 = threshold frequency = 3.6×10^{14} Hz.

ν = frequency of incident light = 6.8×10^{14} Hz

By photoelectric equation,

$$eV_0 = h\nu - h\nu_0$$

where $V_0 \rightarrow$ cut off potential of photoelectron.

$$(1.6 \times 10^{-19})\, V_0 = 6.63 \times 10^{-34} (6.8 \times 10^{14} - 3.6 \times 10^{14})$$

$$= 6.63 \times 10^{-34} (3.2 \times 10^{14})$$

$$V_0 = \frac{6.63 \times 10^{-34} (3.2 \times 10^{14})}{(1.6 \times 10^{19})}$$

$$= 6.63 \times 10^{-34} (2 \times 10^{-5})$$

$$= 13.26 \times 10^{-39}\ V$$

$$= 1.326 \times \cancel{10^{-38}}\ V$$ //

18. (b)

For ~~Eng~~ two coherent sources each of intensity I,

intensity of central maxima $= 4I = I_0$.

[at central maxima, phase difference $(\phi) = 0$

Intensity $= 4I\cos^2(\phi/2) = 4I$].

$$\frac{\Delta x}{\lambda} = \frac{\phi}{2\pi}$$

$$\left(\Delta x = \frac{\lambda}{3}\right)$$

$$\frac{\lambda}{3\lambda} = \frac{\phi}{2\pi} \Rightarrow \phi = \frac{2\pi}{3}$$

$$\text{Intensity} = 4I\cos^2(\phi/2) = 4I\cos^2(\pi/3) = \frac{4I}{4} = I$$

$$= \frac{I_0}{4}$$

20. $${}^{1}_{0}n + {}^{235}_{92}U \longrightarrow {}^{140}_{54}Xe + {}^{94}_{38}Sr + 2\,{}^{1}_{0}n$$

$$\Delta m = \left[m({}^{235}_{92}U) + m({}^{1}_{0}n)\right] - \left[m({}^{140}_{54}Xe) + m({}^{94}_{38}Sr) +\right.$$

Space for writing Question Number

$2m({}^{1}_{0}n_a)]$

$\Delta m = 235.04393\,u + 1.00866\,u - (139.92164 + 93.91536)$
$- 2(1.00866).$

$= 235.04393 - 1.00866 - (233.837).$

$= 234.03527 - 233.837 = 0.199827\,u$ //.

BE = Binding energy = Δmc^2.

$= 0.199827 \times 931$ Mev

$= 184.18937$ Mev

21. Resistance of wire at $25°C = R_{25} = 10\,\Omega$

Resistance of wire at $125°C = R_{125} = 10.5\,\Omega$.

(i) $R_{125} = R_{25}(1 + \alpha \Delta T)$

$10.5 = 10(1 + \alpha(125 - 25))$

$10.5 = 10 + 10(\alpha)(100)$

$0.5 = 1000\,\alpha$.

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$\alpha = 0.5 \times 10^{-3}\ C^{\circ -1} = 5 \times 10^{-4}\ C^{\circ -1}$

(iii) $R_{425} = R_{25}(1 + \alpha \Delta T)$

$= 10(1 + 5 \times 10^{-4}(425 - 25))$

$= 10 + 10 \times 5 \times 10^{-4} (4) \times 10^{2}$

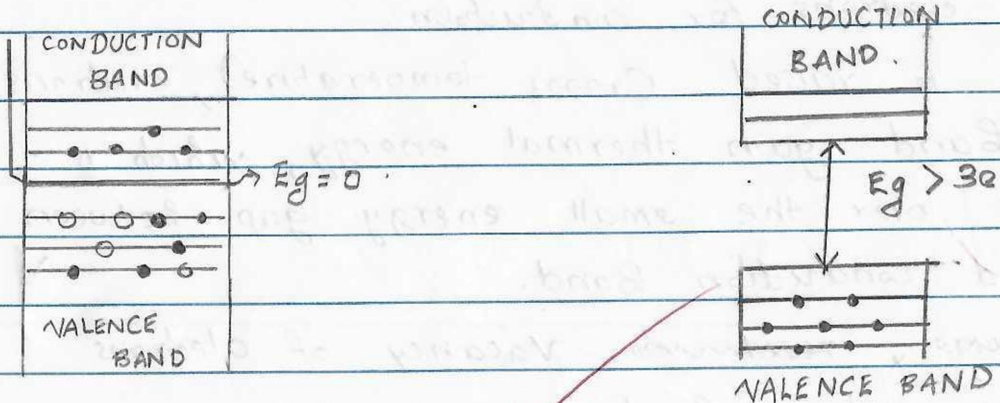
$= 10 + 5 \times 4 \times 10^{-1}$

$= 10 + 20 \times 10^{-1} = 10 + 2$

$= 12\ \Omega$ //

SECTION - C.

22.(a)



Conductors   Insulators

o → holes

• → electrons   Eg → energy gap

139.92164
93.91536
233.83700

235.04393
$-\ 1.00866$
234.03527
233.83700
1.79827
$\times\ 931$
179827
539481
1618443
224.18937

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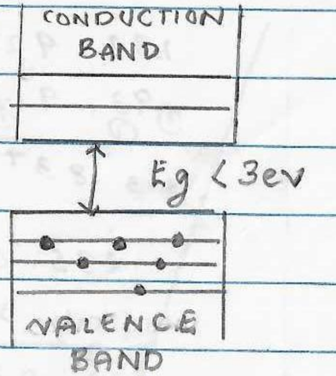
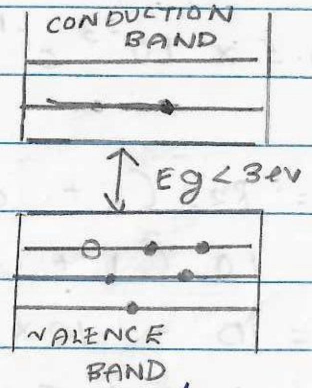


Semiconductors.

at T = 0 K.



Semiconductor.

at T > 0 K.

→ At T = 0 K, semiconductor acts as an insulator due to absence of free electrons for conduction.

→ When temperature is raised (room temperature), electrons in the valence band gain thermal energy, which is sufficient to cross over the small energy gap between valence band and conduction band.

→ ~~This~~ ~~when electrons~~ ~~reaches~~ Vacancy of electrons produced in the valence band generate holes.

→ This is how electron - hole pairs are generated at room temperature is semiconductors.

Space for writing Question Number

23 (b) → Carbon and silicon, both contain 4 valence electrons in second shell and third shell respectively.

→ As valence electrons in carbon are much closer to the nucleus, compared to that of silicon, they are strongly held by the nucleus.

→ Energy required to remove an electron i.e Ionisation Enthalpy, of carbon is much greater than silicon.

→ Hence, due to unavailability of free electrons, carbon acts as an insulator. Whereas, silicon acts as a semiconductor.

E_g carbon > E_g silicon $\qquad E_g \to$ energy gap.

25. Generally, $C = \dfrac{A \varepsilon_0 k}{d}$

$A \to$ Area of parallel plate

$d \to$ seperation between parallel plate

(a) $C_{eq} = \dfrac{C_1 C_2}{C_1 + C_2}$ (in series)

where $\boxed{C_1 = \dfrac{K A \varepsilon_0}{d/2} = KC}$ & $\boxed{C_2 = \dfrac{2 A \varepsilon_0}{d} = C}$

Space for writing Question Number

$$C_{eq} = \frac{kCC}{kC + C} = \frac{C^2 (k)}{C (k+1)} = \frac{kC}{k+1}$$

$$= \left(\frac{k}{k+1}\right) \frac{2A\varepsilon_0}{d} \text{ Farads}$$ //

(b) $C_{eq} = C_1 + C_2$ (parallel connection).

$$C_1 = \frac{A}{2} \frac{\varepsilon_0 k}{d} = kC, \quad C_2 = \frac{A}{2} \frac{\varepsilon_0}{d} = C$$

$$C_{eq} = kC + C = C(k+1)$$

$$= (k+1) \frac{A\varepsilon_0}{2d} \text{ Farads}$$ //

24. $d = 1mm = 1 \times 10^{-3} m$

$D = 1m$

$\lambda_1 = 500nm = 5 \times 10^{-7} m$

$\lambda_2 = 600nm = 6 \times 10^{-7} m$

(a) Position of First maxima of λ_1 (x_1) $= \frac{\lambda_1 D}{d}$ $(\Delta x = 1\lambda_1)$

Space for writing Question Number

Position of ~~oet~~ first maxima for λ_2 (x_2) $= \frac{\lambda_2 D}{d}$ $(\Delta x = (1)\lambda_2,$

Distance between first maximas $= x_2 - x_1$

$= \frac{D}{d}(\lambda_2 - \lambda_1)$

$= \frac{1}{1 \times 10^{-3}}(6-5) \times 10^{-7}\,m$

$= 10^{-4}\,m$ //.

(b). Let position of n_1th bright of $\lambda_1 = \frac{n_1 \lambda_1 D}{d}$.

Let position of n_2th Brigth of $\lambda_2 = \frac{n_2 \lambda_2 D}{d}$.

For both to coincide,

$\frac{n_1 \lambda_1 D}{d} = \frac{n_2 \lambda_2 D}{d}$.

$\frac{n_1}{n_2} = \frac{\lambda_2}{\lambda_1} = \frac{600}{500} = \frac{6}{5}$

$\therefore$ 6th bright fringe of λ_1 coincides with 5th bright fringe

λ_2 (first)

Minimum distance from central maxima

$$= \frac{6 \lambda_1 D}{d} = \frac{6 \times 5 \times 10^{-7} \times 1}{10^{-3}}$$

$$= 30 \times 10^{-4}\ m$$

$$= 3 \times 10^{-3}\ m = 3\ mm.$$

25. Halfwave Rectifier.

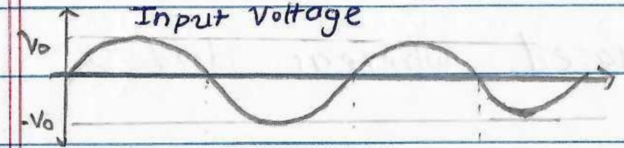
⇒ Rectifier where only ~~K~~ one half cycle of ~~output~~ voltage is rectified

Full wave Rectifier

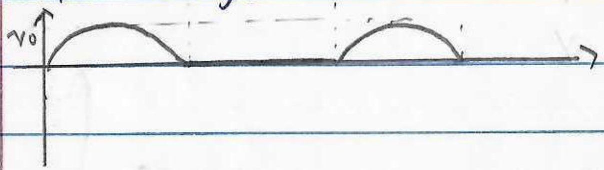
⇒ Rectifier where both cycles of ~~input~~ output voltage is rectified.

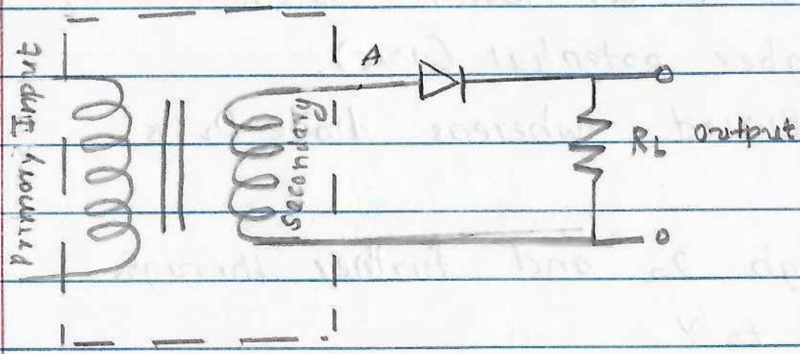
HALFWAVE RECTIFIER	FULL WAVE RECTIFIER.
⇒ Only one half cycle of output voltage is rectified	→ Both half cycles of output voltage are rectified
⇒ Makes use of only one diode	⇒ Makes use of two four diodes.

Input Voltage



Output Voltage.

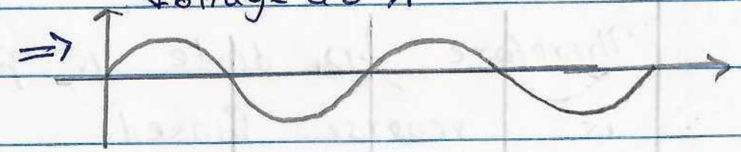




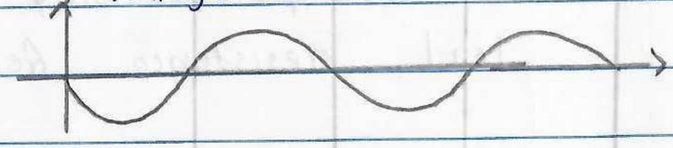
Transformer.

=> Centre tapping is not provided

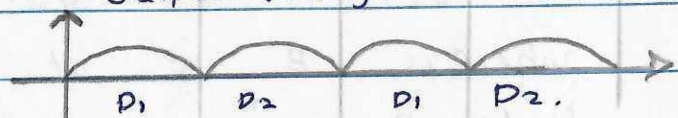
Voltage at A

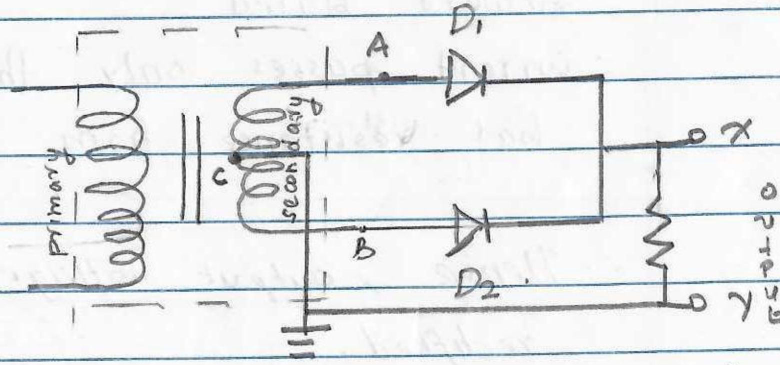


Voltage at B.



Output Voltage.





=> Centre tapping is prodvided

* During first positive half cycle in full wave rectifier, ~~poten~~ A is at higher (+ve) potential while B is in lower potential.

Therefore, D_1 diode is forward biased whereas diode D_2 is reverse biased.

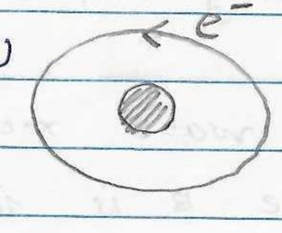
∴ Current passes only through D_1 and further through load resistance from X to Y.

⇒ In second half cycle, A is at lower potential (-
whereas B is at higher potential (+ve).
Diode D_1 is reversed biased whereas diode D_2 is forward biased.

∴ Current passes only through D_2 and further through load resistance from X to Y.

∴ Hence, output voltage across load resistance is fully rectified.

26. (a)



Magnetic dipole moment = NIA

⊙ here, Number of turns (N) = 1.

⊙ current = $I = \frac{q}{t} = \frac{e}{t}$

Space for writing Question Number

$t = \frac{2\pi r}{v}$. where v is velocity of e^-.

$r \Rightarrow$ radius of loop / orbit.

$\therefore I = \frac{ev}{2\pi r}$ //

A = Area of loop = πr^2.

$\Rightarrow \mu = NIA$.

$\therefore \mu = 1 \left(\frac{-ev}{2\pi r}\right) \pi r^2 = -\frac{evr}{2}$ //.

Direction of dipole moment is out of the plane. $\odot$
(By right hand thumb rule).

(b). $\vec{\mu} = -\frac{evr}{2}$.

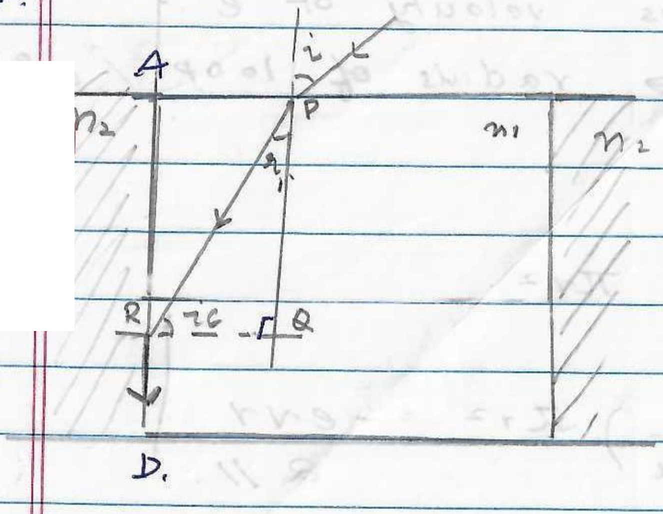
$\vec{L}$ = angular momentum = mvr.

$\therefore vr = \frac{\vec{L}}{m}$.

$\vec{\mu} = -\left(\frac{e}{2}\right)\frac{\vec{L}}{m} = \left(\frac{-e}{2m}\right)\vec{L}$ //.

Space for writing Question Number

27.



$n_1 = 1.5$

$n_2 = 1.25.$

If light grazes out at AD,

$\angle r_2 = 90°$.

$\Rightarrow$ By snell's law. at AD

$n_1 \sin i_1 = n_2 \sin r_2$

$\sin i_1 = \dfrac{n_2}{n_1}$ $(r = 90°)$

$i_1 = \sin^{-1}\left(\dfrac{n_2}{n_1}\right) = i_c,$

$\therefore$ i_1 is the critical angle when light travels from glass to liquid.

From triangle PQR,

$r_1 + i_c = 90$

$r_1 = 90 - i_c$.

$\sin r_1 = \sin(90 - i_c) = \cos i_c$

$= \sqrt{1 - \sin^2 i_c}$

$= \sqrt{1 - \left(\dfrac{1.25}{1.5}\right)^2}$

Space for writing Question Number

$\sin r_1 = \sqrt{1 - \left(\frac{5}{6}\right)^2} = \sqrt{\frac{11}{6^2}} = \frac{\sqrt{11}}{6}$.

25×5

25×6

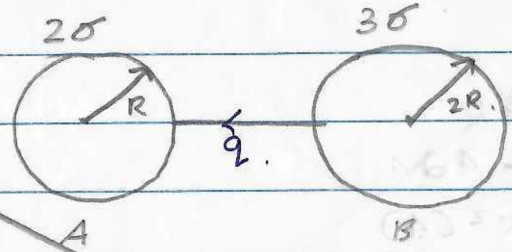
Applying snell's law at AB.

$1 (\sin i) = n_2 (\sin r_1)$

$\sin i = 1.5 \frac{\sqrt{11}}{6} = \frac{3}{2} \times \frac{\sqrt{11}}{6} = \frac{\sqrt{11}}{4}$ //.

$i = \sin^{-1}\left(\frac{\sqrt{11}}{4}\right)$

28. (a)



(initially).

$Q_A = 2\sigma (4\pi R^2)$

$Q_B = 3\sigma (4\pi (2R)^2)$

$= 3\sigma (4\pi R^2) \times 4$.

$= 6 [2\sigma (4\pi R^2)] = 6 Q_A$.

On connecting,

$V_A = V_B$.

$\frac{k (Q_A + q)}{R} = k \frac{(Q_B + q)}{2R}$.

$2 Q_A + 2q = Q_B + q$.

$q = Q_B - 2 Q_A$

$= 6 Q_A - 2 Q_A$

$= 4 Q_A$ //.

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$\therefore$ Charge density on A $= \dfrac{Q_A + q}{4\pi R^2}$

$= \dfrac{Q_A + 4Q_A}{4\pi R^2}$

$= \cancel{Q}\ \dfrac{5Q_A}{4\pi R^2}$

$= 5\,(2\sigma)$ ~~[illegible]~~ $= 10\sigma$ //

$\therefore$ Charge density on B. $= Q_B - q.$

$= \dfrac{6Q_A - 4Q_A}{4\pi R^2 (4)}$

$= \dfrac{2Q_A}{4\pi R^2 (4)} = \dfrac{2\,(2\sigma)\,4\pi R^2)}{4\pi R^2\ (4)}$

$= \sigma$ //

SECTION - D.

29.(i) (B) $\dfrac{NBA}{K}$.

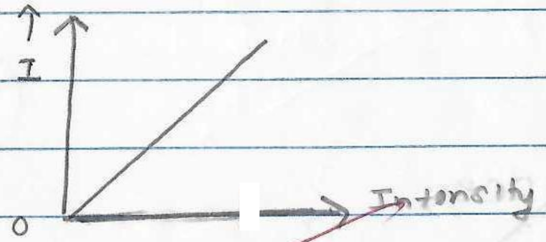
(ii) (A) $0.25\,\Omega$

Space for writing Question Number

(iii) (B) 0.24~~/2~~.

(iv) b ~~(iv)~~ (B) 1.8×10^{-4} Nm.

30 (i) ~~(iv)~~ (C)



(ii) (D) remains same.

(iii) (C) cutoff potential versus Frequency of incident light.

(iv) (A) Caesium.

~~SECTION - E~~.

~~31 (a) (i)~~

PTO →

$6(0.2) = S(4.8)$.

$S = \frac{6(2)}{48} = \frac{12}{48} = \frac{1}{4}$.

$\frac{6(1/4)}{6 + 1/4} = \frac{3/2}{\frac{25}{4}}$

$= \frac{3}{25} \times 2$

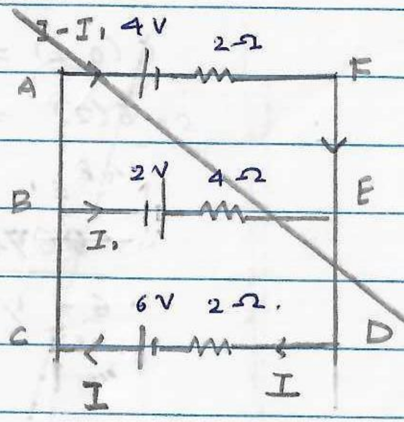
$\frac{24}{100} = \frac{6}{25}$.

$\tau = NBIA$.

$= 100 \times \frac{2}{10} \times 5 \times 10^{-3} \times 18 \times 10^{-4}$

$= 18 \times 10^{-5}$.

Space for writing Question Number



~~Using~~

⇒ Kirchoff's Loop rule states that sum of potential difference ~~are~~ across a closed loop is zero.

Using KVL in loop BEDCB,

$$+2 - 4I_1 - 2I + 6 = 0$$

$$8 = 4I_1 + 2I$$

$$4 = 2I_1 + I$$

$$I = 4 - 2I_1$$

Using KVL in loop AFDCA,

$$-4 - 2(I - I_1) - 2I + 6 = 0$$

$$6 = 4 + 2I - 2I_1 + 2I$$

$$= 4 + 4I - 2I_1$$

$$3 = 2 + 2I - I_1$$

$$3 = 2 + 8 - 4I_1 - I_1$$

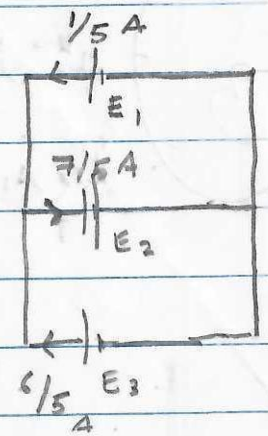
$$5I_1 = 10 - 3 = 7$$

Space for writing Question Number

$I_1 = 7/5$.

$I = 4 - 2(I_1) = 4 - \frac{14}{5} = \frac{20-14}{5} = \frac{6}{5}$ //.

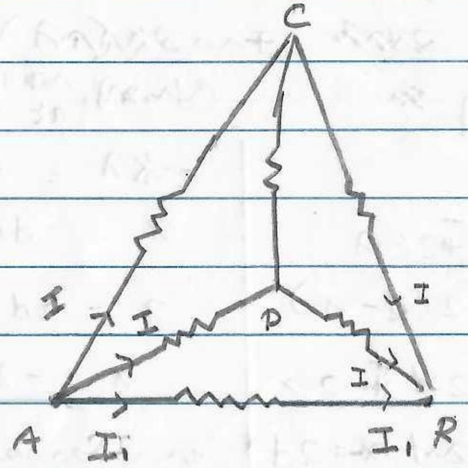
Current through $E_1 = |I - I_1| = \frac{1}{5}$ A.



Current through $E_2 = I_1 = \frac{7}{5}$ A.

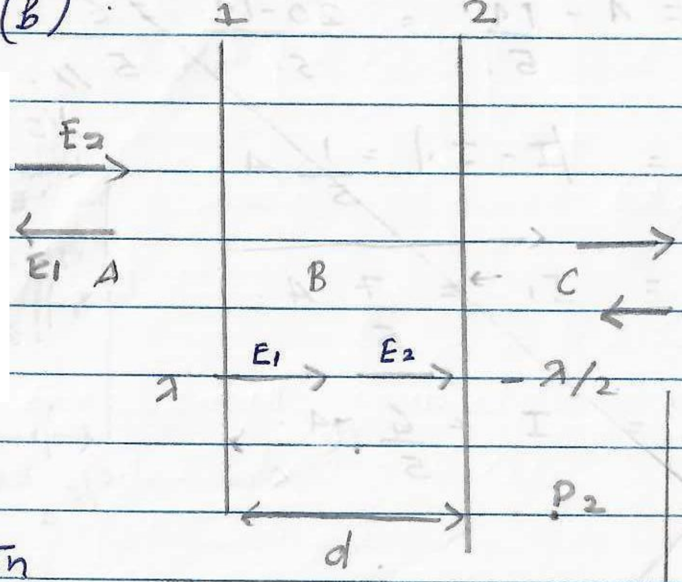
Current through $E_3 = I = \frac{6}{5}$ A.

(11).



SECTION - C.

~~30~~ 28. (B)



E due to infinitely long wire

$$= \frac{\lambda}{2\pi\varepsilon_0 r}$$

$$= \frac{2k\lambda}{r}.$$

In

Region ~~A~~ C //

$$\frac{2k\lambda}{d+x} = \frac{2k}{x}\left(\frac{\lambda}{2}\right)$$

$$d + x = 2x.$$

$$d = x //$$

at region C,

a point at distance 2d from wire 1 has zero electric field.

In region B, & A

~~E_p~~ $\frac{2k\lambda}{x}$ ~~$\frac{2k\lambda}{x}$~~ ~~$\frac{2k(\lambda)}{(d+x)}$~~

$\boxed{\text{at B}}$ $\boxed{\text{at A}}$

$E_p = 0 //$

$$\frac{2k\lambda}{x} = \frac{-2k\lambda}{2(d-x)}$$

$$x = -2d + 2x.$$

~~3x~~ ~~2d~~. $x = 2d$

$$x = +2d$$

$$d - x = -ve \times$$

$$\frac{2k\lambda}{x} = \frac{2k}{d+x}\left(\frac{\lambda}{2}\right)$$

$$x = 2d + 2x$$

$$x = -2d$$

~~in region B,~~

~~E at a distance~~

~~2d/3 from wire 1~~

~~The~~ There is no such point at A & B

~~There is no such point at A & B.~~

Space for writing Question Number

32. (B) (i) When current passing through neighbouring coil is varied, flux linked with to coil$_1$ due to varying current in neighbouring coil$_2$ changes with time.
This induces an ~~efu~~ emf in coil A.
This phenomenon is called mutual induction.

Let current pass through neighbouring coil$_2$ be I_2, and flux linked with coil A$_1$ due to neighbouring coil be ϕ.

Induced emf in coil A $= \mathcal{E} \propto -\frac{d\phi}{dt}$ - $\frac{dI_2}{dt}$.

$$\mathcal{E} = -M_{12}\frac{dI_2}{dt}$$

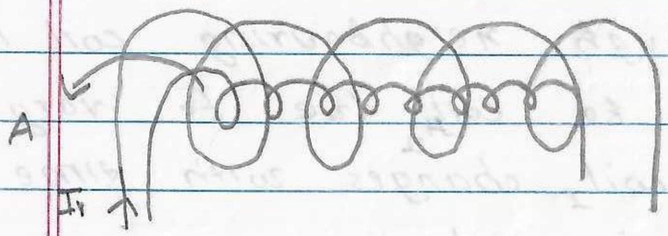
The constant of proportionality is called mutual ~~&~~ inductance where M_{21} is the mutual inductance of coil 1 with respect to coil$_2$.

$N_1\phi_1 \propto I_2$ — $N_1 \rightarrow$ no of turns in coil 1.

$N_1\phi_1 = M_{12}I_2$.

Constant of proportionality is called mutual inductance.

Space for writing Question Number



~~Let~~

For ~~Longer~~ large solenoid,

current $= I_1$.

(A_1) Area $= \pi r_1^2$.

Length $= l$,

number of turns per unit length $= n_1$

For small solenoid,

(A_2) Area $= \pi r_2^2$.

Length $= l$.

number of turns per unit length $= n_2$.

We know

$$N_2 \phi_2 = M_{21} I_1.$$

$$N_2 (B_1 A_2) = M_{21} I_1.$$

Assuming magnetic field to be constant along the centre,

$$B_1 = \mu_0 n_1 I_1$$

$$N_2 = n_2 l.$$

$$n_2 l (\mu_0 n_1 I_1) \pi (r_2)^2 = M_{21} I_1.$$

$$M_{21} = \mu_0 n_1 n_2 l \pi (r_2)^2$$

(ii) $$5 mV = \left| L \frac{dI}{dt} \right|$$

$$5 \times 10^{-3} = L \left(\frac{2}{40}\right).$$

$$L = 20 \times 5 \times 10^{-3} H = 10^{-1} H$$

$$\phi = L I$$

$$= 10^{-1} \times \frac{1}{2} Wb.$$

$$= 0.5 \times 10^{-1} Wb$$

$$= 5 \times 10^{-2} Wb.$$

$$\frac{I}{10} = \frac{2}{40} \times 10 = \frac{2}{4} = \frac{1}{2}.$$

$$I_t = \frac{2}{40} t.$$

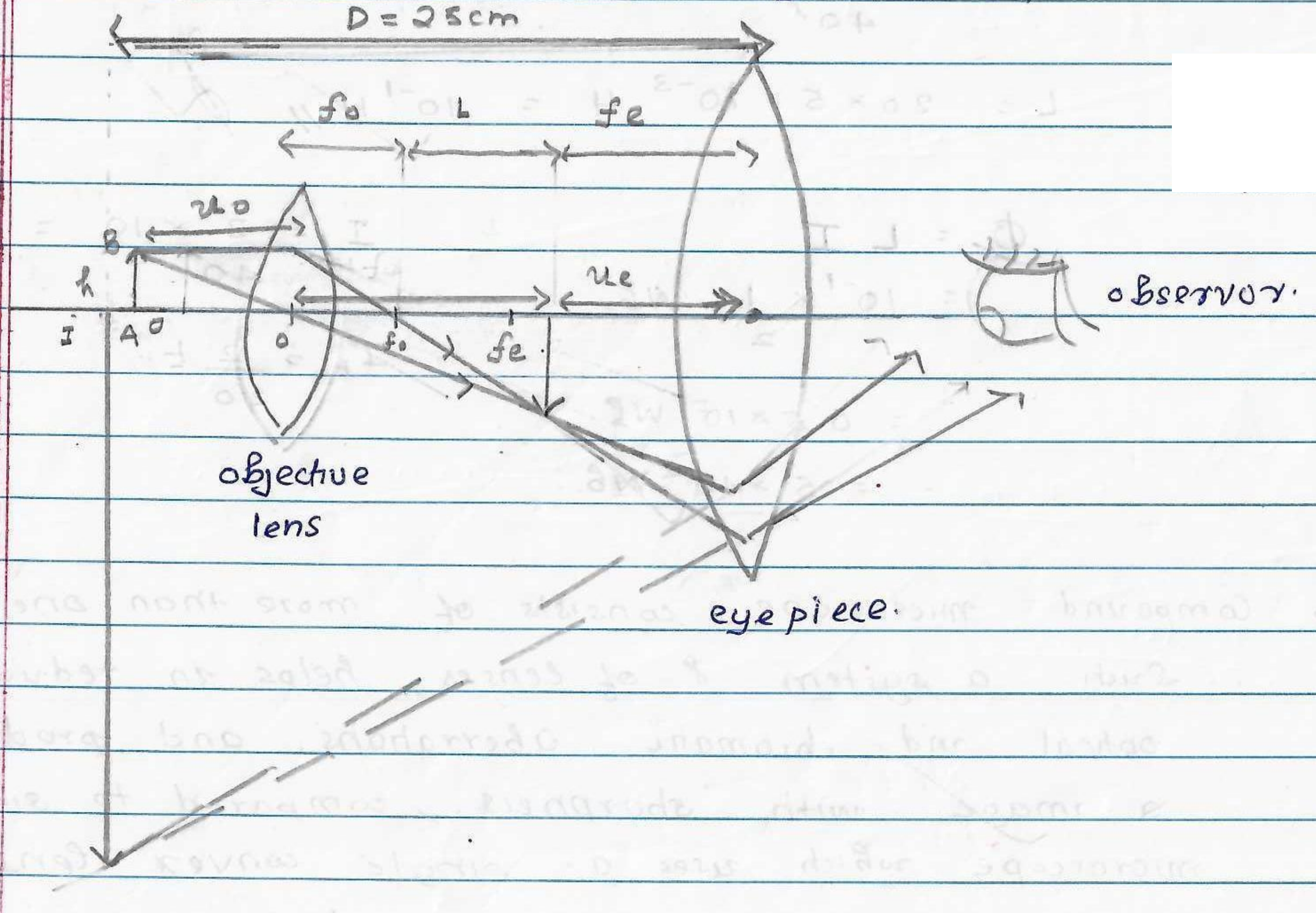
33. (b) → Compound microscope consists of more than one lens.
∴ Such a system of lenses, helps in reducing optical and chromatic aberrations. and produce a image with sharpness., compared to simple microscope which uses a single convex lens

Space for writing Question Number

Magnificaton / magnifying power

→ ~~Compound Magnification~~ is of compound microscope is higher than that of simple microscope as net magnification is equal to product of magnification of each lens used in compound microscope

$$m = m_1 \times m_2 \times \cdots m_n$$



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→ For a small object placed near the objective lens (focal length $= f_o$), the lens create a real inverted magnified image of object between optic centre and focus of eye peice.

⇒ The eye peice consider this real image to be its virtual object and creates a virtual magnified image at least distance of distinct vision (at near point setting)

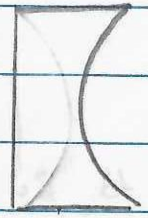
⇒ The final image is magnified and inverted with respect to object.

⇒ L → denotes tube length of compound microscope, which is the distance between ~~first~~ second focus of objective lens and first focus of eye peice.

$$\text{magnifying power (at near point)} = \frac{L}{f_o}\left(1 + \frac{D}{f_e}\right).$$

(11) Len's maker's formula,

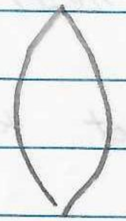
$$\frac{1}{f} = (\mu_L - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$



For thin plano concave lens,

$$P_1 = \frac{1}{f_1} = (n_1 - 1)\left(\frac{1}{\infty} - \frac{1}{R}\right)$$

$$= -\frac{(n_1 - 1)}{R}$$



For equiconvex lens,

$$P_2 = \frac{1}{f_2} = (n_2 - 1)\left(\frac{1}{R} + \frac{1}{R}\right) = \frac{2(n_2 - 1)}{R}$$

$$P_{net} = P_1 + P_2 = \frac{1}{f_1} + \frac{1}{f_2} = \frac{-(n_1 - 1)}{R} + \frac{2(n_2 - 1)}{R}$$

$$= \frac{2n_2 - n_1 - 1}{R} \text{ D}$$

31. (b) (I). $j = \sigma E$.

$j \rightarrow$ current density.

$\sigma \rightarrow$ conductivity.

$$\therefore \frac{E_A}{E_B} = \frac{j_A}{j_B} = \frac{I}{A_A} \times \frac{A_B}{I} = \frac{2 \times 10^{-7}}{1 \times 10^{-7}} = 2.$$

(II) ~~vdha~~ $I = neA(v_d)$

$$v_d = \frac{I}{neA} = \frac{1}{8.5 \times 10^{28} \times 1.6 \times 10^{-19} \times 2 \times 10^{-7}}$$

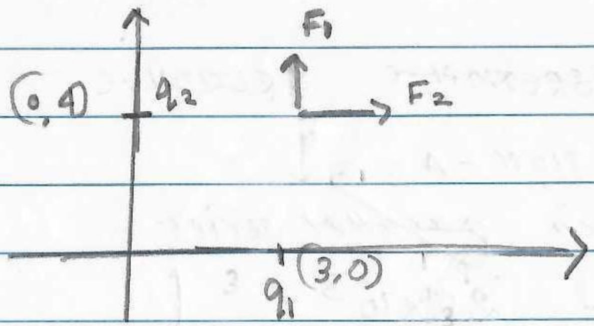
$$= \frac{10^{-28+27}}{8.5 \times 2 \times \cancel{\ } 16}$$

$$= \frac{10^{-1}}{17 \times 16} \text{ m/s}$$

$$= 0.36 \times 10^{-1} \text{ m/s}$$

$$= 3.6 \times 10^{-2} \text{ m/s}$$

(11).



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$$E_{net} = \sqrt{E_1^2 + E_2^2}.$$

$$= \sqrt{\left(\frac{Kq_1}{(3)^2}\right)^2 + \left(\frac{Kq_2}{(4)^2}\right)^2}.$$

$$= K\sqrt{\frac{(16)^2}{9\times9} + \frac{1}{16\times16}} \times 10^{-6}.$$

$$= \frac{K}{16\times9}\sqrt{(16)^4 + (3)^4} \times 10^{-6}.$$

$$= \frac{9\times10^9\times10^{-6}}{16\times9}\sqrt{65536 + 81}$$

$$= \frac{10^3}{16}\sqrt{65617}.$$

$$= 62.5\sqrt{6517}\ N/C$$

~~SECTION-C~~ SECTION-C

30 ~~VB~~ SECTION - A.

19. Adding resistance in ~~parallel~~ series

$V = IR \quad I = \frac{V}{R} = 25\times10^{-3}.$

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$R = \frac{V}{I} - G$

$= 9000\,\Omega$.