# Padasalai's

## Telegram Groups!

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# XII - PHYSICS - 2019 - 2020

## creative one mark

1) A dipole is placed in a uniform electric field with its axis parallel to the field. It experiences

Sol :- Net force

$F = qE + (-qE)$

$F = qE - qE$

$\boxed{F = 0}$

Torque

$\boxed{\theta = 0°}$

$\tau = pE \sin\theta$

$\boxed{\sin(0) = 0}$

$\tau = pE \sin(0)$

$\boxed{\tau = 0}$

2) The capacitance of a parallel plate capacitor increases from 5 pf and 60 pf. dielectric constant is

Sol :- $K = \frac{C_2}{C_1}$

$C_2 = 60\ \mu f$

$C_1 = 5\ \mu f$

$K = \frac{60\ \cancel{\mu f}}{5\ \cancel{\mu f}} = \frac{60}{5}$

$K = \frac{12 \times \cancel{5}}{\cancel{5}} = \boxed{12}$

③ The magnitude of the force acting on a charge of $2\times10^{-10}$ c placed in a uniform electric field of 10 $vm^{-1}$ is

Sol

$F = qE$ $\boxed{q = 2\times10^{-10} C}$

$\boxed{E = 10 vm^{-1}}$

$F = 2\times10^{-10} \times 10$

$F = 2\times10\times10^{-10}$

$F = 20\times10^{-10}$

$F = 2.0\times10^{-9}$

$\boxed{F = 2\times10^{-9} N}$

④ An electron initially at rest is accelerated through a (p.d) of 1 volt. The energy acquired by electron is

Sol

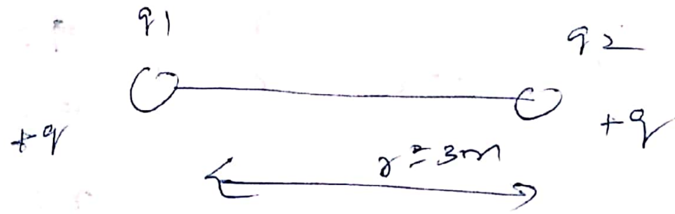
Energy $U = eV$ $\boxed{V = 1J}$

$U = 1.6\times10^{-19}\times1$

$\boxed{U = 1.6\times10^{-19} J}$

6) Two positive charges of 5 and 3 Coulumb are kept at a distance of 3m from each other in vacuum. force..

Sol:




$q_1 = 5C, \quad q_2 = 3C \quad r = 3m$

$$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r^2}$$

$$\frac{1}{4\pi\varepsilon_0} = \frac{1}{4 \times 3.14 \times 8.854 \times 10^{-12}}$$

$$\frac{1}{4\pi\varepsilon_0} = \frac{10^{+12}}{4 \times 3.14 \times 8.854}$$

$$\boxed{\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 N}$$ → constant values

$$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r^2}$$

$$F = (9 \times 10^9) \times \frac{5 \times 3}{(3)^2}$$

$$F = \cancel{9} \times 10^9 \times \frac{15}{\cancel{9}}$$

$$\boxed{F = 15 \times 10^9 N}$$

(6) The potential at a point due to a charge of 100 μC at a distance of 9 m is (4)

Sol:

$$\boxed{V = \frac{1}{4\pi\varepsilon_0}\frac{q}{r}}$$

$q = 100\,\mu C$

$q = 100 \times 10^{-6}\,C$

$r = 9\,m$

$$\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9\,N$$

$$V = (\cancel{9} \times 10^9) \times \frac{100 \times 10^{-6}}{\cancel{9}}$$

$$V = 10^9 \times 100 \times 10^{-6}$$

$$V = 100 \times 10^9 \times 10^{-6}$$

$$V = 100 \times 10^{9-6}$$

$$V = 100 \times 10^3$$

$$V = 10^2 \times 10^3$$

$$\boxed{V = 10^5\,V}$$

1) Three capacitors 0.5 uf, 0.3 uf and 0.2 uf are connected in parallel. Their effective capacitance is

sol:-

$C_p = C_1 + C_2 + C_3$

$C_1 = 0.5\ uf$,

$C_2 = 0.3\ uf$

$C_3 = 0.2\ uf$

$C_p = 0.5\ uf + 0.3\ uf + 0.2\ uf$

$C_p = (0.5 + 0.3 + 0.2)\ uf$

$C_p = (0.5 + 0.5)\ uf$

$\boxed{C_p = 1\ uf}$

2) How many electrons constitute current of one ampere?

sol:- Current $I = \frac{q}{t}$ $\boxed{q = ne}$

$I = \frac{ne}{t}$

$I \times t = ne$

$\frac{I \times t}{e} = n$

$n = \frac{It}{e}$

$\boxed{I = 1A}$

$\boxed{t = 1\ sec}$

$e = 1.6 \times 10^{-19} C$

$n = \frac{1 \times 1}{1.6 \times 10^{-19}}$

6

$$I = \frac{1}{1.6 \times 10^{-19}}$$

$$I = \frac{10^{9}}{1.6}$$

$$\boxed{I = 6.25 \times 10^{18}}$$

(9) A copper wire of $1 mm^2$ area of cross section carries a current of 3A. The current density is

Sol:

$$J = I/A$$

$$\boxed{I = 3A}$$

$A = 1 mm^2$

$A = (1 \times 10^{-3})^2$

$A = (1)^2 \times (10^{-3})^2$

$A = 1 \times 10^{-6}$

$$\boxed{A = 1 \times 10^{-6} m^2}$$

$$J = I/A = \frac{3}{1 \times 10^{-6}} = \frac{3}{10^{-6}}$$

$$\boxed{J = 3 \times 10^{6} Am^{-2}}$$

10) current through a coil is 20 mA when the potential difference across it is 50V. Then, the resistance of the coil is

Sol:

Ohm's law

$\boxed{V = IR}$

$\boxed{V = 50V}$

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

$I = 20 mA$

$I = 20 \times 10^{-3} A$

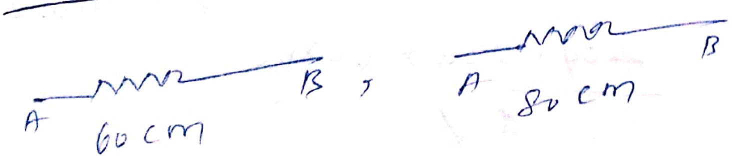
$R = \frac{50}{20 \times 10^{-3}}$

$R = \frac{50 \times 10^{3}}{20} = \frac{5\cancel{0} \times 10^{3}}{2\cancel{0}} = \frac{5}{2} \times 10^{3}$

$R = \frac{\cancel{2} \times 2.5 \times 10^{3}}{\cancel{2}}$

$R = 2.5 \times 10^{3}$

$\boxed{R = 2500\ \Omega}$

11) 


resistance ratio?

Sol:

$l_1 = 60\,cm$

$l_2 = 80\,cm$

$$\frac{R_1}{R_2} = \frac{l_1}{l_2}$$

$$\frac{R_1}{R_2} = \frac{60\times10^{-2}}{80\times10^{-2}}$$

$$\frac{R_1}{R_2} = \frac{60}{80} \times \cancel{10^{-2}\times10^{+2}}$$

$$\frac{R_1}{R_2} = \frac{60}{80}$$

$$\frac{R_1}{R_2} = \frac{6}{8} = \frac{3\times\cancel{2}}{4\times\cancel{2}} = 3/4$$

$$\boxed{R_1 : R_2 = 3:4}$$

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12) An electric iron of Resistance $40\Omega$ is operated at 200V for one hour. The electrical energy consumed is

Sol:

$$\boxed{E = \frac{V^2 t}{R}}$$

$\boxed{V = 200V}$

$t = 1$ hour

$R = 40\Omega$

$$E = \frac{20\cancel{0}\times200\times60\times60}{4\cancel{0}}$$

$$= \frac{20\times200\times60\times60}{4}$$

(9)

$$E = \frac{(\cancel{1}\times 5)\times 200\times 60\times 60}{\cancel{1}}$$

$E = 5\times 200\times 60\times 60$

$E = 1000\times 60\times 60$

$E = 1000\times 3600$

$E = 3600000$

$E = 3.6\times 10^{5}\ J$

$E = 3.6\times 10^{6}\ J$

$\boxed{E = 1\ kWh}$

(10) How much time $10^{20}$ electrons will take to flow through a point, so that the current is 200 mA?

Sol:

$I = \frac{q}{t}$ $\boxed{q = ne}$

$I = \frac{ne}{t}$ $\boxed{n = 10^{20}}$

$I = \frac{ne}{t} = \quad t = \frac{ne}{I}$ $\boxed{I = 200\times 10^{-3} A}$

$$t = \frac{10^{20}\times 1.6\times 10^{-19}}{200\times 10^{-3}}$$

$$t = \frac{10^{20} \times 1.6 \times 10^{-19}}{200 \times 10^{-3}}$$

$$t = \frac{10^{20} \times 1.6 \times 10^{-19} \times 10^{3}}{200}$$

$$t = \frac{10^{20} \times 10^{3} \times 10^{-19} \times 1.6}{200}$$

$$t = \frac{10^{23} \times 10^{-19} \times 1.6}{200}$$

$$t = \frac{10^{23-19} \times 1.6}{200}$$

$$t = \frac{10^{4} \times 1.6}{200}$$

$$t = \frac{1.6 \times 10^{4}}{200}$$

$$t = \frac{160\cancel{00}}{2\cancel{00}}$$

$$t = \frac{160}{2}$$

$$t = \frac{\cancel{2} \times 80}{\cancel{2}}$$ $\boxed{t = 80 \text{ sec}}$

$\boxed{t = 80s}$

14) In a wheatstone's bridge, if the galvanometer shows zero deflection, find the unknown resistance given $P = 1000\Omega$, $Q = 10,000\Omega$ and $R = 20\Omega$ (11)

Sol:

In wheatstone bridge

$$\frac{P}{Q} = \frac{R}{S}$$

$P = 1000\Omega$

$Q = 10,000\Omega$

$R = 20\Omega$

$S = ?$

$$\frac{P}{Q} = \frac{R}{S}$$

$$\frac{P}{Q} = R\left(\frac{1}{S}\right)$$

$$\frac{P}{R \times Q} = \frac{1}{S}$$

$$\boxed{S = \frac{R \times Q}{P}}$$

$$S = \frac{20 \times 10\cancel{000}}{1\cancel{000}}$$

$$S = \frac{20 \times 10}{1}$$

$$S = 20 \times 10$$

$$\boxed{S = 200\Omega}$$

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(15) A wire of length 1m carrying a current of 2A is placed inside a field of magnetic induction 20 T such that it makes an angle of $30^\circ$.

Sol:

$F = BIl\sin\theta$

$B = 20\,T$

$I = 2\,A$ $\qquad \sin(30^\circ) = 1/2$

$l = 1\,m$

$\theta = 30^\circ$

$F = 20 \times 2 \times 1 \times \sin(30^\circ)$

$F = 20 \times 2 \times 1 \times 1/2$

$F = 40 \times 1/2$

$F = (20 \times \cancel{2}) \times 1/\cancel{2}$

$\boxed{F = 20\,N}$

1) An $\alpha$ particle enters a magnetic field of 1 tesla with a velocity $10^6 ms^{-1}$ in a direction perpendicular to the field, the force on $\alpha$ particle is

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Sol:-

$F = Bqv \sin\theta$

$\boxed{\theta = 90^\circ} \rightarrow$ perpendicular

$\boxed{v = 10^6 ms^{-1}}$

$(q = 2 \times 1.6 \times 10^{-19})$

$\boxed{B = 1T}$

$F = 1 \times 10^6 \times (2 \times 1.6 \times 10^{-19}) \times \sin(90^\circ)$

$\boxed{\sin(90^\circ) = 1}$

$F = 1 \times 2 \times 1.6 \times 10^{-19} \times 10^6 \times (1)$

$F = 2 \times 1.6 \times 10^{-19+6}$

$F = 2 \times 1.6 \times 10^{-13}$

$\boxed{F = 3.2 \times 10^{-13} N}$

(17) In step up transformer the output voltage is 11 kV and the input voltage is 220V. The ratio of number of turns of secondary to primary is (1)

Sol:

$$\frac{N_s}{N_p} = \frac{E_s}{E_p}$$

$E_s = 11\ kV$

$E_s = 11 \times 10^3 V$

$\boxed{E_p = 220V}$ $\boxed{E_s = 11000V}$

$\boxed{K \rightarrow Kilo}$

$$\therefore \frac{N_s}{N_p} = \frac{1100\cancel{0}}{22\cancel{0}}$$

$$\frac{N_s}{N_p} = \frac{1100}{22}$$

$$\frac{N_s}{N_p} = \frac{\cancel{22} \times 50}{\cancel{22}}$$

$$\frac{N_s}{N_p} = \frac{50}{1}$$

$$\boxed{N_s : N_p = 50:1}$$

Q) In a penta phase AC generator the phase difference between the emf induced in each (coil) is (15)

Sol: phase difference

360°

penta phase 5

$$\frac{360^\circ}{5} = \frac{72^\circ \times \cancel{5}}{\cancel{5}} = 72^\circ$$

$\boxed{72^\circ}$

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17) The refractive index of glass 1.5. The velocity of light in glass is

Sol: $\mu = \frac{c}{v}$ $\boxed{c = 3\times10^8\ ms^{-1}}$

$v = \frac{c}{\mu}$ $\mu = 1.5$ (No unit)

$$v = \frac{3\times10^8}{1.5}$$

$$v = \frac{2\times\cancel{1.5}\times10^8}{\cancel{1.5}} = 2\times10^8\ ms^{-1}$$

$\boxed{v = 2\times10^8\ ms^{-1}}$

20) The wavelength of electromagnetic wave produced by Hertz's experiment was

Sol:

$$\lambda = \frac{c}{\nu} = \frac{c}{\nu}$$

$$\boxed{c = 3\times10^{8}\ ms^{-1}}$$

$$\boxed{\nu = 5\times10^{7}}$$

$$\lambda = \frac{3\times10^{8}}{5\times10^{7}}$$

$$\lambda = \frac{3\times10^{8}\times10^{-7}}{5}$$

$$\lambda = \frac{3}{5}\times10^{8-7}$$

$$\lambda = \frac{3\times10^{1}}{5}$$

$$\lambda = \frac{30}{5}$$

$$\lambda = \frac{6\times\cancel{5}}{\cancel{5}}$$

$$\boxed{\lambda = 6m = 600\,cm = 6000mm}$$

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1) The energy of a photon is $3\times10^{-19}J$. The momentum of the photon is equal to ______

soln

$E = mc^2$

$p = mc$

$E = pc$

$E = 3\times10^{-19}J$

$c = 3\times10^{8} ms^{-1}$

$p = \frac{E}{c}$

$p = \frac{3\times10^{-19}}{3\times10^{8}}$

$p = \frac{3}{3} \times 10^{-19} \times 10^{-8}$

$p = \frac{3}{3} \times 10^{-19-8}$

$p = 3/3 \times 10^{-27}$

$p = 1 \times 10^{-27}$

$\boxed{p = 10 \times 10^{-28} kgms^{-1}}$

$p = 10\times10^{-28} kgms^{-1}$

(22) The energy of a photon of red light of wavelength 6000 A° is ______

Sol:-

$$E = h\nu \quad \boxed{\nu = \frac{c}{\lambda}}$$

$$E = \frac{hc}{\lambda}$$

$$E = \frac{6.626 \times 10^{-34} \times 3 \times 10^{8}}{6000 \times 10^{-10}}$$

$$E = \frac{6.626 \times 10^{-34} \times 3 \times 10^{8}}{6 \times 10^{3} \times 10^{-10}}$$

$$E = \frac{6.626 \times 3 \times 10^{-34} \times 10^{8}}{6 \times 10^{-7}}$$

$$E = \frac{6.626 \times 3 \times 10^{-34} \times 10^{8} \times 10^{+7}}{6}$$

$$E = \frac{6.626 \times 3}{6} \times 10^{-34} \times 10^{15}$$

$$E = \frac{6.626 \times \cancel{3}}{\cancel{6}} \times 10^{-34+15}$$

$$E = \frac{6.626}{2} \times 10^{-19}$$

$$\boxed{E = 3.313 \times 10^{-19} J}$$

3) In Millikan's experiment an oil drop of mass $4.9 \times 10^{-14}$ kg is balanced by applying a p.d of 2kV between the two plates which are 8 mm apart. Calculate the number of elementary charges on the drop take g as $10\ ms^{-2}$

Sol:

$$n = \frac{mgd}{eV}$$

$m = 4.9 \times 10^{-14}$

$g = 10\ ms^{-2}$

$d = 8\ mm$

$d = 8 \times 10^{-3} m$

$e = 1.6 \times 10^{-19}\ C$

$V = 2 \times 10^{3}\ V$

$$n = \frac{mgd}{eV}$$

$$n = \frac{4.9 \times 10^{-14} \times 10 \times 8 \times 10^{-3}}{1.6 \times 10^{-19} \times 2 \times 10^{3}}$$

$$n = \frac{4.9 \times 10 \times 8 \times 10^{-14-3}}{1.6 \times 2 \times 10^{-19} \times 10^{3}}$$

$$n = \frac{4.9 \times 10 \times 8 \times 10^{-17}}{1.6 \times 10^{-19+3} \times 2}$$

$$n = \frac{4.9 \times 80 \times 10^{-17}}{1.6 \times 2 \times 10^{-16}}$$

$$n = \frac{4.9 \times 80}{1.6 \times 2} \times 10^{-17} \times 10^{+16}$$

$n = \frac{\cancel{392}}{3.2} \times 10^{-1}$

$n = \frac{392}{3.2} \times 10^{-1}$

$n = 122.5 \times 10^{-1}$

$n = 12.25$

$\boxed{n = 12}$

24. If 1 kg of a substance is fully converted into energy then the energy produced is

Sol :-

$E = mc^2$

$m = 1$

$c = 3 \times 10^8$

$E = 1 \times (3 \times 10^8)^2$

$E = 1 \times (3)^2 \times (10^8)^2$

$E = 1 \times 9 \times 10^{16}$

$\boxed{E = 9 \times 10^{16}\ J}$

25) What is the approximate momentum of electron if its de Broglie wavelength is $2\mathring{A}$?

Sol:

$$\lambda = \frac{h}{p}$$

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

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

$$mv = \frac{6.626 \times 10^{-34}}{2 \times 10^{-10}}$$

$$mv = \frac{6.626}{2} \times 10^{-34} \times 10^{+10}$$

$$mv = \frac{6.626}{2} \times 10^{-34+10}$$

$$mv = \frac{6.626}{2} \times 10^{-24}$$

$$\boxed{mv = 3.313 \times 10^{-24}\ Kgms^{-1}}$$

26) The energy equivalence of a mass of 1 milligram is

Sol:

$$E = mc^2$$

$$m = 1 \text{ milligram} = 1 \times 10^{-3} g$$

$$m = 10^{-3} g$$

$$E = 10^{-3} \times (3 \times 10^8)^2$$

$$E = 10^{-3} \times (3)^2 \times (10^8)^2$$

$$E = 10^{-3} \times 9 \times 10^{16}$$

$$E = 9 \times 10^{16} \times 10^{-3}$$

$$E = 9 \times 10^{16-3}$$

$$E = 9 \times 10^{13}$$

$$E = 9000 \times 10^{10}$$

$$\boxed{E = 9000\,A0}$$

27) The energy equivalence of a mass of 1 microgram is

Sol:-

$E = mc^2$ 1 microgram $= 1 \times 10^{-6}$

$E = 10^{-6} \times (3 \times 10^8)^2$

$E = 10^{-6} \times (3)^2 \times (10^8)^2$

$E = 10^{-6} \times 9 \times 10^{16}$

$E = 9 \times 10^{16-6}$

$E = 9 \times 10^{10}$ J

$\boxed{E = 9 \times 10^{10}}$



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28 The nuclear radius of $^{8}_{4}Be$ nucleus is

Sol.:

$R = r_0 (A)^{1/3}$

$R = 1.3 \times 10^{-15} (8)^{1/3}$

$R = 1.3 \times 10^{-15} (2^3)^{1/3}$

$R = 1.3 \times 10^{-15} \times 2$

$R = 2 \times 1.3 \times 10^{-15}$

$\boxed{R = 2.6 \times 10^{-15} \text{ m}}$

(29) The mass defect of a certain nucleus is found to be 0.03 amu its binding energy is

Sol:-

$$BE = (\Delta m)\, 931 \text{ MeV}$$

$$BE = 0.03 \times 931 \text{ MeV}$$

$$\boxed{BE = 27.93 \text{ MeV}}$$

(30) According to the laws of Boolean algebra, the expression $(A + AB)$ is equal to

Sol:-

$(A + AB)$ $\boxed{1 + B = 1}$

$$(A + AB) = A(1 + B)$$

$$= A(1)$$

$$= A$$

31) In common emitter transistor circuit, the base current ($I_B$) of the transistor is 50 (μA) and the collector current ($I_C$) is 25mA. Then current gain is

Sol:

$$\beta = \frac{I_C}{I_B}$$

$I_C = 25mA$

$I_C = 25 \times 10^{-3} A$

$I_B = 50 \times 10^{-6} A$

$$\beta = \frac{25 \times 10^{-3}}{50 \times 10^{-6}}$$

$$\beta = \frac{25 \times 10^{-3}}{50} \times 10^{+6}$$

$$\beta = \frac{25}{50} \times 10^{-3+6}$$

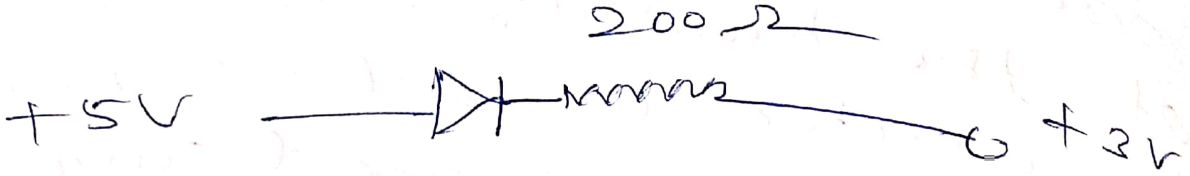
$$\beta = \frac{25}{50} \times 10^{3}$$

$$\beta = \frac{2500\cancel{0}}{5\cancel{0}}$$

$$\beta = \frac{2500}{5} = \frac{\cancel{5} \times 500}{\cancel{5}}$$

$$\boxed{\beta = 500 \text{ (No unit)}}$$

(32) The value of current in the following circuit is




Sol:

forward biased

$= 5 - 3$

$= 2V$

Ohm's law

$V = IR$

$\boxed{V = 2V}$

$\boxed{R = 200\Omega}$

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

$I = \frac{2}{200}$

$I = \frac{2}{2 \times 10^{2}}$

$\boxed{I = 10^{-2} A}$

33) What will be the input of A and B for the Boolean expression $(\overline{A+B})(\overline{A \cdot B}) = 1$ ?

sol:- $\boxed{A=0}$ $\boxed{B=0}$

$(\overline{A+B})(\overline{A \cdot B}) = (\overline{0+0}) \cdot (\overline{0 \cdot 0})$

$= (\bar{0}) \cdot (\bar{0})$

$= 1 \times 1$

$= 1$

34) prove that $A \cdot A = A$

sol:-

| A | A · A | |
|---|---|---|
| 0 | 0 · 0 | = 0 |
| 1 | 1 · 1 | = 1 |

$\boxed{A \cdot A = A}$

| $A$ | $\bar{A}$ | $\bar{\bar{A}}$ |
|---|---|---|
| 0 | 1 | 0 |
| 1 | 0 | 1 |

$$\boxed{\bar{\bar{A}} = A}$$

(36) prove that $A(\bar{A}+B) = AB$

sol:- $A(\bar{A}+B)$

$A(\bar{A}+B) = A\bar{A} + AB$

$= 0 + AB$

$= AB$ $\boxed{A\bar{A} = 0}$

$A(\bar{A}+B) = AB$

(37) prove that $A(A+B) = A$

sol:-

$$A(A+B) = AA + AB$$

$$= A(1+B)$$

$$= A(1)$$

$$= A$$

$$\boxed{A(A+B) = A}$$

38) In an AM Receiver, the Local oscillator frequency is 2750 KHz. The tuned in station frequency is

sol:

2750 KHz

2750 − 455

$\boxed{2295 \text{ KHz}}$

39) The half life period of a radioactive element is 15 hour. At the end of 30 hours the fraction of the radioactive element remaining is

sol:

30 hours = 2 half lives

$$\boxed{n=2}$$

$$\frac{1}{2^n} = \frac{1}{2^2} = \frac{1}{4}$$

46 Half life time of a radioactive element is 25 hours. After 100 hours, what will be the fraction of the sample left undecayed?

Sol:-

100 hours = 4×25

$$\boxed{n=4}$$

$$\frac{1}{2^n} = \frac{1}{2^4} = \frac{1}{2\times2\times2\times2}$$

$$= \frac{1}{4\times2\times2}$$

$$= \frac{1}{8\times2}$$

$$= 1/16$$

(41) The polarising angle for water is $53^\circ 4'$, calculate its refractive index

$\mu = \tan i_p$

$i_p = 53^\circ 4'$

$\mu = \tan(53^\circ 4')$

$\boxed{\mu = 1.33}$

The refractive index of water $\mu = 1.33$.

(42) Calculate the radius of the orbit of quantum number 2 in the case of $H_2$ atom. Take the relevant values from the tables.

$r_n = n^2 r_1$ $\boxed{n=2}$

$r_2 = (2)^2 \times 0.53 \times 10^{-10}$

$\boxed{r_1 = 0.53\,A^\circ}$

$r_2 = 4 \times 0.53 \times 10^{-10}$

$r_2 = 2.12 \times 10^{-10}$

$\boxed{r_2 = 2.12 A^{\circ}}$

(43) find the radius of the 3rd Bohr orbit of the H atom

Sol:-

$r_n = n^2 r_1$

$\boxed{n = 3}$

$r_3 = (3)^2 \times 0.53 \times 10^{-10}$

$r_3 = 9 \times 0.53 \times 10^{-10}$

$r_3 = 4.77 \times 10^{-10} m$

$\boxed{r_3 = 4.77 A^{\circ}}$