Physics – XII Nov-2017

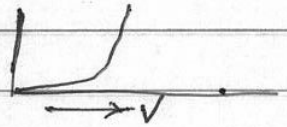
Ans key

Section A

Q1 X is C_1 and Y is C_2 As energy stored in any capacitor is area under Q v/s V

Q2 +Z axis

Q3 Eddy currents

Q4 

Q5 Accelerated charge particle.

Section B

Q6 γ-rays produced when heavier nucleus undergo decay
Used to treat cancer ii used as Radioactive tracers

Q7 Use $r = \frac{1}{4\pi\varepsilon_0}\frac{2eq_\alpha}{\frac{1}{2}mv^2} = 2.476\times10^{-14}$ m.

Or

Three Bohr's Postulates.

Q8 Art. showing $r \propto n^2$

Q9 using $\mu = \frac{\sin\frac{A+\delta_m}{2}}{\sin A/2}$ we get $\delta_m = 60°$

Q10 Art. 8

~~Q11~~

Section C

Q11 (a) ~~$I_{rms} = R^2 + X_L^2$~~ $I_{rms} = \frac{V_{rms}}{Z}$ where $Z = \sqrt{R^2 + X_L^2}$

PTO

(b) i $V_R = I_{rms} R$ $V_L = I_{rms} X_L$ (c) As there is phase difference between V_R & V_L

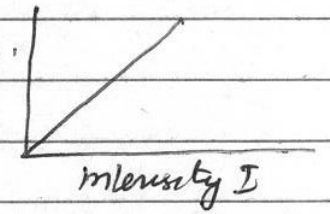
Q12) Energy of the photon $= \frac{hc}{\lambda} = 0.2eV$ As $E_g > 0.2eV$ So not detected

Q13 (a) circular (b) Helical iii $\vec{E}$ should in +y axis

Or

$$\frac{r_\alpha}{r_p} = \frac{m_\alpha v_\alpha}{q_\alpha B} \times \frac{q_p B}{m_p v_p} = 4 \times \frac{1}{2} = 2$$

Q14 As $E = \frac{hc}{\lambda} = \frac{6.6 \times 10^{-34} \times 3 \times 10^8}{3300 \times 10^{-10} \times 1.6 \times 10^{-19}} = 3.75eV$



As $E > W$ for Na So photoemission will happen with Na

Q15 (a) $E = \frac{6}{3} = 2V$ (b) $I = 1A$ $V = \frac{3.0}{3} = 1V$ So $R = \frac{E-V}{I} = 1\Omega$

c) for max power dissipation $R_{in} = R_{ext}$

$R_{min} = 3 \times 1 = 3\Omega$ $I = \frac{3E}{3+3} = \frac{E}{2} = 1A$

Q16 X - modulator
Y = Amplifier $\mu = \frac{A_m}{A_c}$ or $\frac{A_{max} - A_{min}}{A_{max} + A_{min}}$

Q17 $C_{eq} = 2\mu F$ $U = \frac{1}{2} C_{eq} V^2 = 36 \times 10^{-6} J$

Q18 (i) graph ii) $U = q V_1 - q_2 V_2 + \frac{1}{4\pi\epsilon_0} \frac{q(-q_0)}{2d}$

PTO

Q19 Art (i) $N_2 = N_0 e^{-\lambda t}$ (ii) Mean life $T = \frac{1}{\lambda}$

Q20 (i) Art. (b) $\sin i_c = \frac{\mu_2}{\mu_1}$ where i_c = critical angle and μ_1 & μ_2 are Ref. index

Q21 (a) (i) diffusion of holes from p-to n
(ii) Drift of electrons from n to p

(b) Circuit of full wave rectifier

Q22 Art.

Section D

Q23 (a) knowledge, presence of mind, etc.
(b) use $S = \frac{I_g G}{I - I_g}$ here $G = 15$ $I_g = 4mA$ $I = 100 mA$.

Section E

Q24 Art
OR
Art

Q25 (a) Definition $\frac{N}{C} m^2$ Derive $E = \frac{\lambda}{2\pi\varepsilon_0 r}$ $E \propto \frac{1}{r}$

(b) Art.

OR

Q25 Art (b), (i) $V = \frac{V_0}{K}$ and $E = \frac{E_0}{K}$

PTO

P-4

Q26 Art · with proper diagram find A and A₂

OR

(a) Def · Show OR, NOT, AND from NAND only

(b) Truth table =

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

So circuit is OR gate