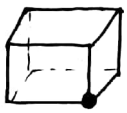
XII PHYSICS QUESTION PAPER Marks : 70
Time : 3 hrs

Section A [5×1]

1. (i)
(A)  q charge is placed at a corner of the cube, Total electric flux through the box is

a) $q/8\epsilon_0$ b) $q/24\epsilon_0$ c) $q/6\epsilon_0$ d) $q/4\epsilon_0$

(B) Magnetic susceptibility of diamagnetic substance

a) >0 b) <0 c) $\gg 0$ d) $\ll 0$

(C) Light is incident at an angle 60° at the interface of refracting medium, the reflected Light becomes plane Polarised. Refractive index of medium

a) $1/\sqrt{3}$ b) $1/2$ c) $\sqrt{3}/2$ d) $\sqrt{3}$

(D) α (Alpha) particle has

a) 2p, 2n, $2e^-$ b) 2p, $2e^-$ c) 2p, 2n d) 2n, $2e^-$

(E) In γ-ray emission from nucleus

a) neutron, proton no. change b) no change c) only neutron number changes
d) proton number changes

(ii) [7×1]

A. Draw equipotential surface for an isolated point charge.

B. What is the phase difference between current and voltage in purely resistive circuit?

C. $R = 15 \times 10^3 \Omega \pm 10\%$ Write the colour code.

D. Young's Double slit apparatus is completely immersed in Water (R.I n) What will be the change in fringe width β?

E. What is stopping potential?

F. Name the Series in atomic Spectra that falls in visible region.

G. Construct OR gate by using NAND gates.

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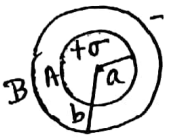
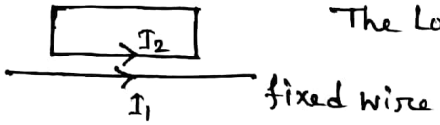
Section B [11×2]

2. A cell of emf 4V and of negligible internal resistance is connected in series with potentiometer wire of length 400cm. The emf of Leclanche cell is found to balance on 150 cm of the potentiometer wire, find emf of Leclanche cell.

3. 

Calculate the potential of shell A.

4. $\Phi = 5t^3 + 4t^2 + 2t - 5$ Calculate induced emf at $t = 2s$.

5. 

The loop is free to move. In which direction does the loop begin to move. Reason?

6. 

Write an expression and direction of the magnetic field at a point P on the axis of the loop.

7. Define the Dip Angle.

8. Write any two uses of U-V rays.

9. What is Binding energy

10. For second Balmer Line calculate change in angular momentum of the transition electron.

11. Activity drops to 1/16 th of its initial value in 30 years. Calculate half Life of the radioactive Substance.

12. Write two differences between AM and FM.

Section C [7×3]

13. Write Boolean expression, Truth table, Logic symbol of NOR gate.

14. How the width of depletion region changes in reverse biasing? Draw forward and reverse bias characteristic of p-n Junction.

15. Derive the relation $N = N_0 e^{-\lambda t}$. Draw N vs t graph.

16. From Bohr's theory show that energy of n-th orbit electron $E_n \propto \frac{1}{n^2}$

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18. Derive the law of refraction (Snell's law) using Huygen's theory.

19. A thin prism of 5° angle gives a deviation of 3.2°. What is the value of refractive index of the material of prism?

17. 

Find expression for capacitance.

Section D

20. a) The radii of curvature of double convex lens are 15 cm and 30 cm. its refractive index is 1.5. Calculate its focal length.

b) Derive the relation $\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$ for spherical refracting surface. [2+3]

21. a) Draw lebelled diagram of full wave rectifier. Draw input output wavefront.

b) Derive an expression for magnifying power of Astronomical Telescope when final image is formed at infinity. [2+3]

22. a) State Malus Law.

b) State Gauss's Law.

c) Find an expression for Torque on a current loop placed in a uniform magnetic field. [1+1+3]

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