Jain College, Jayanagar

MOCK PAPER - II

Subject: II PUC Physics (33)

Duration: 3 hrs 15 minutes **Max. Marks: 70**

Part A

I. Answer all the following: **10×1 =10**

1. State Gauss's law in electrostatics.
2. What is the value of resistance of an ideal voltmeter?
3. The susceptibility of magnetic substance is 2500. Name the type of magnetic substance?
4. How does the time period of oscillation of a bar magnet in a uniform magnetic field vary with its magnetic moment?
5. Mention one use of infrared rays.
6. Give one method of increasing the resolving power of microscope.
7. State Malu's law.
8. How many neutrons are present in the nucleus of $_{56}Ba^{141}$?
9. Write the circuit symbol of NOR gate.
10. Space wave propagation is limited to which region of atmosphere?

Part B

II Answer any FIVE of the following questions: **5×2=10**

11. Explain the meaning of the statement' "electric charge of a body is quantised".
12. On what factors does the capacitance of a parallel plate depend?
13. Define Conductivity. State its SI unit
14. Define the terms, magnetic declination and Dip at a place.
15. State Farday's laws of electromagnetic induction.
16. What is critical angle? Give one application of total internal reflection.
17. In a transistor, the base is lightly doped. Explain Why?
18. What does the term "LOS" communication means? Name the type of waves that are used for this communication.

Part C

III Answer any FIVE of the following questions: **5×3=15**

19. Obtain the relation between electric field and electric potential
20. Obtain the expression for effective capacitance of 2 capacitors connected in parallel.
21. What is cyclotron? Draw its schematic labelled diagram.
22. Derive an expression for an energy stored in inductor.
23. Show that voltage and current are in phase with each other when an AC voltage is applied across a resistor. Represent this in a phasor diagram.
24. Derive the relation $f = \frac{R}{2}$ in the case of a concave mirror.
25. What is photoelectric effect? State its laws from Einstein's Photoelectric equation.
26. Classify metals, semiconductors and insulators on the basis of energy bands.

Part D

IV Answer any Two of the following questions: **2×5=10**

27. Define Dipole moment and obtain the expression for the electric field at a point on the axis of an electric dipole.
28. State ohm's law. Deduce ohm's law in vector form $\vec{J} = \sigma\vec{E}$.
29. Derive an expression for magnetic dipole moment of a resolving electron in a hydrogen atom.

V Answer any Two of the following questions: **2×5=10**

30. Give five differences between interference and diffraction of light.
31. State the law of radioactive decay. Show that $N = N_o e^{-\lambda t}$ for a radioactive element.
32. What is amplification? Explain the working of n-p-n transistor in CE mode as an amplifier with circuit diagram.

VI. Answer any Three of the following questions: **3×5=15**

33. Four point charges q_A = 2μc; q_B = -5μc; q_C =2μc; q_D = -5μA are located at the corners of a square ABCD of side 10 cm. What is the force on a charge of 1 μc placed at the centre of the square?
34. Two cells of emf 6V and 4V having internal resistance of 3Ω and 2 Ω respectively are connected in parallel so as to send a current through an external resistance of 8 Ω in the same direction. Find the current through the cells and the current through the external resistance.
35. A resistance of 50 Ω, an inductance of 10 mH and a capacitance 20μF are connected in series to a 220V, 50 hz AC source. Calculate the current in the circuit and the power factor.
36. Calculate the angle of minimum deviation produced by an equilateral prism of refractive index 1.65.
37. An electron transmission occurs from n=4 and n=2 energy level in hydrogen atom. Find the wavelength of the emitted radiation if the energy of the electron in the ground state is -13.6 eV. To which series does the spectral line belong?

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