Date: *SUBJECT: PHYSICS*

II PUC
Mock paper II

Timings Allowed: 3 Hrs.   *Total Marks: 70*

General Instructions:
- All parts are compulsory.
- Answer without relevant diagram/figure wherever necessary will not carry any marks.
- Direct answers to numerical problems without detailed solutions will not carry any marks.

PART-A

I Answer **ALL** the following questions: **10x1=10**
1. Draw the electric field lines for a system of two positive point charges.
2. Is electric current a scalar or a vector?
3. The susceptibility of magnetic substance is 2500. Name the type of magnetic substance.
4. State Curie's law.
5. Define one henry.
6. Write the expression for magnifying power of a telescope in terms of focal length?
7. What is the velocity of liberated electron when a photon of energy equal to the work function of a metal is incident on it?
8. What is the rest mass of photon?
9. How many joule are there in 1MeV?
10. Write the circuit symbol of NAND gate.

PART-B

II Answer any **FIVE** of the following questions: **5x2=10**
11. Mention any two properties of electric lines of force.
12. How does the resistivity of the following materials vary with the increase in their temperature (i) metallic conductor and (ii) semiconductor.
13. When is the torque on a magnetic dipole in a uniform magnetic field be (i) minimum and (ii) maximum?
14. What are eddy currents? Mention one application of eddy currents?
15. Mention the principle behind the working of a transformer. Can a transformer be used to set up a DC voltage?
16. Mention the expression for Ampere-Maxwell's law and explain the terms.
17. Draw a intensity distribution curve of diffraction due to a single slit.
18. What is photo diode? Mention the principle of photo diode?

PART-C

III Answer any **FIVE** of the following questions: **5x3=15**
19. Derive an expression for the energy stored in a charged capacitor.
20. Mention the principle of moving coil galvanometer. Write an expression for angular deflection produced in moving coil galvanometer and explain the terms used.
21. Derive an expression for torque experienced by a magnetic dipole when placed in an external magnetic field.

22. Derive an expression for motional emf when a conductor is moving perpendicular to the magnetic field.
23. With a ray diagram, explain the phenomenon of total internal reflection and hence define critical angle.
24. Mention three experimental observations of photoelectric effect.
25. Classify metals, semiconductors and insulators on the basis of energy bands.
26. What is modulation? Mention any two reasons, why modulation is important for communication system?

PART-D
IV Answer any **TWO** of the following questions: $\hspace{6cm}$ **2x5=10**
27. Derive an expression for electric potential due to an electric dipole.
28. Define 'internal resistance' and 'emf ' of a cell. Obtain the expression for current drawn by external resistance using ohm's law.
29. Derive an expression for the force between two long straight parallel conductors carrying current and hence define ampere.

V Answer any **TWO** of the following questions: $\hspace{6cm}$ **2x5=10**
30. Arrive at lens maker's formula.
31. State the radioactive decay law. Show that $N=N_0e^{-\lambda t}$ for a radioactive element.
32. With a neat circuit diagram, explain the working of an npn transistor in CE mode as a switch.

PART-E
VI Answer any **THREE** of the following questions: $\hspace{5.5cm}$ 3x5=15
33. ABC is a right angled triangle such that AB=3m, BC=4m and $\angle B$ = 90^0. Charges of 9nC and -16nC are placed at the corners A and C respectively. Calculate the resultant electric intensity and direction at point B.
34. The number density of conduction electrons is 9.5×10^{28} m^{-3}. Calculate the time taken by an electron to drift from one end of the wire 4m long to the other end. The area of cross-section of the wire is 1.8×10^{-6} m^2 and is carrying a current of 5 ampere.
35. A galvanometer of resistance 80Ω requires a current of 1mA for full scale deflection. How to convert it into an voltmeter of range 0-10V and an ammeter of range 0-5A.
36. In young's double slit experiment, the distance between the slits is 1.2mm and the screen is 0.75m from the slits. If the distance of the 5th fringe from the central fringe on the screen is 1.8mm. Calculate the wavelength of light used. What will be the distance of the 5th dark fringe from the centre of the screen?
37. The first member of the Balmer series of hydrogen atom has wavelength 6563A^0. Calculate the wavelength and frequency of the second member of Paschen series. (Given: c = 3×10^8 ms^{-1}).

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