Jain College, Jayanagar
II PUC Mock Paper (II)
Subject: PHYSICS

Duration: 3 Hrs 15 mins **Max.Marks: 70**

General Instructions:

1. **All parts are compulsory.**
2. **Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.**
3. **Direct answers to numerical problems without detailed solutions will not carry any marks.**

PART – A

(I) Answer the following questions **10 x 1 = 10**

1. What is meant by electric flux through a surface?
2. What is a toroid?
3. What are eddy currents?
4. What is the value of magnetic dip at a place where $B_H = 0$?
5. Name the electromagnetic radiation used for viewing objects through haze and fog.
6. Give an example for the waves which cannot be polarized.
7. Which is more energetic, photon of violet light or photon of red light?
8. What is critical mass?
9. Write the circuit symbol of a photodiode.
10. Define modulation index.

PART – B

(II) Answer any FIVE of the following questions **5 x 2 = 10**

11. Define dipole moment of an electric dipole. Write an expression for it.
12. How is galvanometer converted to a voltmeter? What is effective resistance of an ideal voltmeter?
13. Define magnetization (M) and magnetic intensity (H).
14. Mention any two properties of magnetic field lines.
15. Write any two uses of gamma rays.
16. Mention the condition for diffraction maxima and minima in Fraunhoffer single slit experiment.
17. Give the circuit symbol and truth table of NOR gate.
18. Define attenuation and transmitter in communication.

PART – C

(III) Answer any FIVE of the following questions **5 x 3 = 15**

19. Explain any three properties of charges.
20. Obtain an expression for the equivalent resistance of two resistors connected in parallel.
21. Distinguish between diamagnetic and paramagnetic substances.
22. Describe coil and magnet experiment to demonstrate electromagnetic induction.
23. Show that current leads voltage in an AC circuit containing capacitor only.
24. Deduce the relation between radius of curvature and focal length of a concave mirror.
25. Mention any three characteristics of nuclear forces.
26. Explain the working of pn junction in the reverse bias.

PART – D

(IV) Answer any TWO of the following questions **2 x 5 = 10**

27. Derive an expression for energy stored in a capacitor.
28. Obtain expression for balance condition of a wheatstone network.
29. State and explain Biot-Savart's law. Express it in vector form.

(V) Answer any TWO of the following questions **2 x 5 = 10**

30. Give the theory of interference and arrive at the condition for constructive and destructive interference.
31. Write Einstein's photoelectric equation. Explain the experimental observations of photoelectric effect based on Einstein's photoelectric equation.
32. With a neat circuit diagram, describe the working of a full wave rectifier. Draw the input and output waveforms.

PART – E

(VI) Answer any THREE of the following questions. **3 x 5 = 15**

33. ABCD is a square of side 2m. Charges of qA = 5 μC, qB = 10 μC, qC = 5 μC are placed at corners A,B and C respectively. What is the work done in transferring a charge of 5 μC from D to the point of intersection of the diagonals?
34. Two identical cells either in series or in parallel combination give the same current of 0.5 A through external resistance of 4 Ω. Find the emf and internal resistance of each cell.
35. A series LCR circuit is connected to 220 V ac source of variable frequency. The inductance of the coil is 5H, capacitance of the capacitor is 5 μF and resistance is 40 Ω. At resonance calculate
    a. Resonant frequency
    b. Current in the circuit
    c. The inductive reactance.
36. At what angle should a ray of light be incident on the face of a prism of refracting angle 60^{o}, so that it first suffers total internal reflection at other face? The refractive index of the prism is 1.524.
37. Calculate the half life and mean life of radium – 226 of activity 1 Ci; given the mass of radium – 226 is 1 gram and 266 gram of radium consists of 6.o23 x 10^{23} atoms.

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