Jain College, Jayanagar
II PUC Mock Paper (I)
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. Is the force acting between two point charges q_1 and q_2 kept at some distance apart in air attractive or repulsive if $q_1q_2 > 0$?
2. When a straight wire of resistance R is bent in U shape does its resistance change?
3. A charged particle is found to experience a force both when it is static and while in motion in a certain region. What is the kind of field present?
4. What is the net magnetic moment of an atom of diamagnetic material?
5. Mention the SI unit of magnetic flux.
6. Define wavefront.
7. What is a moderator?
8. What is meant by doping?
9. Draw the logic diagram of OR gate.
10. What is transducer?

PART – B

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

11. Mention any two properties of electric field lines.
12. Differentiate between emf and terminal potential difference.
13. What is mutual induction? Mention the SI unit of mutual induction.
14. State any two properties of electromagnetic waves.
15. Draw ray diagram for image formation of compound microscope.
16. What are the merits of Bohr's theory?
17. Calculate the binding energy in MeV of nucleus with a mass defect of 0.3u.
18. Draw the block diagram of a receiver in communication system.

PART – C

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

19. Obtain an expression for potential energy of a system of two charges in presence of external field.
20. Show that a circular current loop behaves as a magnetic dipole.
21. Define the earth's magnetic elements – dip, declination and horizontal component.
22. Write three characteristics of magnetic material used for making permanent magnets.
23. What is hypermetropia? Explain with a ray diagram how it can be corrected?
24. Sketch the energy level diagram for hydrogen atom.

25. List any three properties of α and β radiations.
26. Explain the working of zener diode as a voltage regulator.

PART – D

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

27. State Gauss's law in electrostatics. Obtain an expression for electric field due to an infinite plane sheet.
28. Define equivalent resistance. Obtain an expression for equivalent resistance when two resistors are connected in parallel.
29. Obtain an expression for force between two parallel conductors carrying current in the same direction. Hence define Ampere.

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

30. Obtain lens makers formula.
31. State radioactive decay law. Show that $N = N_o e^{-\lambda t}$.
32. With a neat labeled diagram explain the working of an n-p-n transistor in CE mode as an amplifier.

PART – E

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

33. Two capacitors of capacitances 5 μF and 10 μF are charged to 16 V and 13 V respectively. What is the common potential when they are connected in parallel with
    a. The plates having similar charges together.
    b. The plates having opposite charges together.
34. The terminals of a cell of emf 1.5 V are connected to the ends of a 10 Ω coil. If the current in the circuit is 140 mA, calculate the internal resistance of the cell.
35. An inductance of 100 mH and a resistor of 50 Ω are connected in series to an ac source of 230 V, 50 Hz, calculate the impedance, effective current and phase angle.
36. In young's interference experiment, two narrow parallel slits 0.2mm apart are illuminated by a light of wavelength 600 nm to get interference fringe pattern on a screen 0.8 m away from the slits. Calculate the distance of
    a. Third dark fringe from the central fringe and
    b. Second bright fringe from the central fringe.
37. Light of wavelength 430 nm is incident on a) nickel surface of work function 5 eV and b) potassium surface of work function 2.3 eV. Find out from which metal electrons area emitted. Also calculate the maximum velocity of electrons emitted from this metal.

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