Date: *SUBJECT: PHYSICS*

II PUC
Mock-II

Timings Allowed: 3Hrs 15 Minutes.   *Total 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.   **10 X 1 = 10**
1. State Gauss's law in electrostatics.
2. Write the color sequence for a carbon resistor of resistance 5.2M±20%
3. Mention the use of Cylotron.
4. North pole of a bar magnet is moved towards a metal ring .What is the direction of induced current in the ring when viewed from magnet side.
5. How the power of lens is related to its focal length?
6. What kind of lens can produce both real and virtual images?
7. What is the ionization energy of the hydrogen atom?
8. Write the working principle of LED.
9. Name the logic gate which has only one input.
10. What is a sky wave?

PART-B

II. Answer any FIVE of the following questions: **5 X 2 = 10**
11. Draw electric field lines for (i) a point charge (q<0) (ii) two equal positive charges.
12. How many number of electrons that should flow per second in a conductor to provide 1A?
13. What is the principle of Meter Bridge? Mention one application of a potentiometer.
14. Which type of magnetic material exhibit the property of hysteresis? Define coercivity.
15. Mention any two practical applications of eddy currents.
16. Mention the expression for speed of light in free space and explain the terms used.
17. What is meant by binding energy per nucleon? Mention its importance.
18. Draw the block diagram of a generalized communication.

PART-C

III. Answer any FIVE of the following questions: **5 X 3 = 15**
19. Obtain the relation between electric field and electric potential.
20. Define electrical resistivity of a conductor. Mention two factors on which the resistivity of conductor depends.
21. With a circuit diagram explain how a pointer galvanometer is converted into ammeter.
22. The current in a circuit falls from 5A to 0 in 0.1s. if an average emf of 200V is induced , estimate the self-inductance of coil .
23. Derive an expression for resonant frequency of series LCR circuit.
24. Draw a neat ray diagram for image formation of compound microscope in normal adjustment.
25. Explain the working of p-n junction when it is forward biased.
26. Explain briefly the observations of Geiger-Marsden's experiment on scattering of α-particles by a nucleus.

PART-D

IV. Answer any TWO of the following questions: **2 X 5 = 10**

27. Derive an expression for the electric field at any point on the equatorial plane of a short electric dipole.
28. State ohm's law. Deduce its vector form $J=\sigma E$.
29. Show that a current carrying solenoid is equivalent to a bar magnet.

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

30. Arrive at lens maker's formula.
31. Write the experimental observations of photoelectric effect with relevant graphs.
32. What is transistor? Explain the basic action of npn transistor.

VI. Answer any THREE of the following questions: **3 X 5 = 15**

33. When two capacitors are connected in series and connected across 4kV line, the energy stored in the system is 8J. The same capacitors if connected in parallel across the same line, the energy stored is 36J. Find the individual capacitances.

34. An alpha particle describing a circle of radius 0.45m in a magnetic field of 1.2 T. Calculate its speed and frequency of rotation. Mass of α-particle $=6.8 \times 10^{-27}$kg.

35. A resistance of 50Ω, an inductance of 10mH and a capacitance $20\mu F$ are connected in series to a 220V, 50 Hz AC source. Calculate the current in the circuit and power factor.

36. In Young's double slit experiment, fringes of certain width are produced on the screen kept at a distance from the slits. When screen is moved away from the slits by 0.1 m, fringe width increases by 6×10^{-5}m. The separation between the slits is 1mm. calculate the wave length of the light used.

37. Determine the mass of Na^{22} which has an activity of 5mCi. Half-life of Na^{22} is 2.6 years. Avogadro number$= 6.023 \times 10^{23}$ atoms.

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