MODEL QUESTION PAPER-I

FOR REDUCED SYLLABUS 2020-21

Time: 3 Hours 15 min. II PUC PHYSICS (33) Max.Marks:70

General Instructions:

(i) *All parts are compulsory.*

(ii) *Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.*

(iii) *Direct answers to Numerical problems without detailed solutions will not carry any marks.*

PART-A

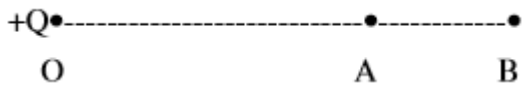
I. Answer ALL the following questions. **10 × 1 = 10**

1. What is electrostatic shielding?
2. A wire of resistivity ρ is stretched to three times its length. What will be its new resistivity?
3. Mention the SI unit of magnetic moment.
4. State Gauss's law in magnetism.
5. Name the law used to find the polarity of induced emf in a coil.
6. Name the physical quantity which remains same for microwaves of wavelength 1 mm and UV radiations of 160 nm in vacuum.
7. A concave lens of refractive index 1.5 is immersed in a medium of refractive index 1.65. What is the nature of the lens?
8. How does the stopping potential of a photosensitive material vary with intensity of incident radiation?
9. Mention any one limitation of Bohr's atomic model.
10. Write the relation between radius of the nuclei and its mass number.

PART-B

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

11. State and explain Coulomb's law.
12. Write the relation between electric field and potential. A point charge +Q is placed at point O as shown in the figure. Is the potential difference $V_A - V_B$ positive, negative or zero?



13. Define the terms: (a) drift speed and (b) mobility of an electron in a conductor.
14. Explain how galvanometer can be converted to an ammeter.
15. Write the expression for magnetic field inside a solenoid and explain the terms.
16. Define magnetic dip and declination.
17. A pair of adjacent coils has a mutual inductance of 1.5 H. If the current in one coil changes from 0 to 20 A in 0.5 s, what is the change of flux linkage with the other coil?

What is a wave front? Name the type of wave front observed from a distant point source.

PART- C

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

19. Write any three properties of electric field lines.
20. Derive the expression for potential energy of a system of two point charges in the absence of external electric field.
21. Write any three limitations of Ohm's law.
22. State Kirchhoff's laws. Name the Kirchhoff's law which is a consequence of principle of conservation of energy.
23. Obtain the expression for radius of circular path of charged particle in a magnetic field.
24. Name any three sources of energy loss in a transformer.
25. Write any three characteristics of nuclear force.
26. Give any three differences between n-type and p-type semiconductors.

PART-D

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

27. Derive an expression for electric field on the equatorial line of an electric dipole.
28. Using Biot Savarts's law, obtain the expression for magnetic field along the axis of a circular current loop.
29. What is AC generator? Derive an expression for the instantaneous emf in AC generator.

V. Answer any TWO of the following questions. **2 × 5 = 10**

30. Derive lens makers formula.
31. Using Bohr's postulate obtain the expression for total energy of electron in hydrogen atom.
32. With the help of a neat circuit diagram, explain the working of full wave rectifier.

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

33. A 4 μF capacitor is charged by a 200 V supply. It is then disconnected from the supply, and is connected to another uncharged 2 μF capacitor. How much electrostatic energy of the first capacitor is lost in the form of heat and electromagnetic radiation?
34. Six lead-acid type of secondary cells each of emf 2.0 V and internal resistance 0.015 Ω are joined in series to provide a supply to a resistance of 8.5 Ω. What are the current drawn from the supply and its terminal voltage?
35. A sinusoidal voltage of peak value 283 V and frequency 50 Hz is applied to a series LCR circuit in which R = 3 Ω, L = 25.48 mH, and C = 796 μF. Find (a) the impedance of the circuit, (b) the phase difference between the voltage across the source and the current and (c) the power dissipated in the circuit.
36. In a Young's double-slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is measured to be 1.2 cm. Determine the fringe width and the wavelength of light used in the experiment.

The work function of caesium is 2.14 eV. Find (a) the threshold frequency for cesium and (b) the wavelength of the incident light if the photocurrent is brought to zero by a stopping potential of 0.60V.

****