II PUC PHYSICS
SUPPLIMENTARY EXAM SEPTEMBER 2020

Part – A

I. Answer all the following questions:. (10 × 1 = 10)

1.What is the electric field inside a thin charged spherical shell?
2. Define dielectric constant in terms of capacity of a parallel plate capacitor.
3. Draw the curve to show the variation of resistivity as a function of temperature for copper
4. State Ampere's circuital law
5. Mention any one use of eddy current
6. Give the wavelength range of electromagnetic spectrum.
7. How does the power of a lens related to its focal length?
8. What is diffraction of light?
9. Name the SI unit of activity.
10. Which logic gate is used as inverter?

Part – B

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

11. Write any two properties of electric field lines.
12. Define the terms 'drift velocity' and mobility of free electrons
13. When does the force experienced by a straight current carrying conductor placed in a uniform magnetic field become (a) maximum (b) minimum?
14. What is hysteresis? Mention the significance of hysteresis curve.
15. The current through a coil of 2mH changes from zero ampere to 5mA in 0.1s. What is the emf induced?
16. What is resonant frequency? Write the expression for resonant frequency
17. Mention any two uses of infra-red rays.
18. Write the limitations of Bohr's atomic model

Part – C

III. Answer any five of the following question: (5 × 3 = 15)

19 Derive the relation between electric field and electric potential
20. What is a cyclotron? Draw its neat diagram and label the parts
21. How would you convert a galvanometer in to an ammeter? Explain
22. Describe Faraday and Henry, coil and magnet experiment to demonstrate the electromagnetic induction
23. What is total internal reflection? Mention the conditions for total internal reflection.
24. What is polarization of light? Mention two methods of producing plane polarized light.
25. Derive the expression for radius of electron in the n^{th} Bohr orbit of hydrogen atom
26. What are optoelectronic devices? Name any two optoelectronic devices.

Part – D

IV. Answer any two of the following questions:. (2 × 5 = 10)

27. Derive anexpression for the electric field at a point on the equatorial line of an electric dipole
28. Obtain an expression for the equivalent emf and equivalent resistance of two cells connected in series.
29. Obtain an expression for period of a magnetic dipole kept in a uniform magnetic field and hence obtain an expresion for magnetic field

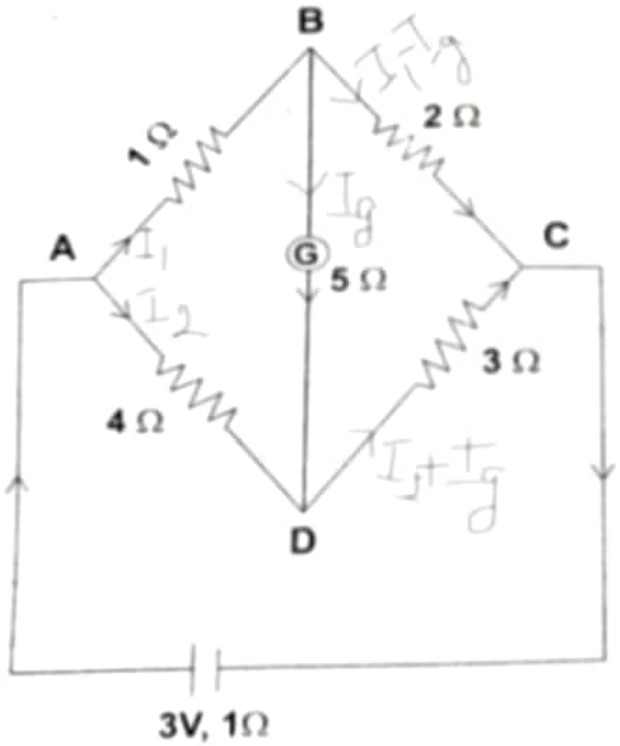
V. Answer any two of the following questions: (2 × 5 = 10)

30. Derive an expression for the fringe width in case of Young's Double Slit experiment.
31. Write the experimental observations of photoelectric effect.
32. What is a Zener diode? Explain the action of Zener diode as a voltage regulator with a relevant circuit diagram.

VI. Answer any three of the following: (3 × 5 = 15)

33. In a parallel plate capacitor with air between the plates , each plate has an area 8×10^{-3} m^2 and distance between the plates is 2 mm. Calculate the capacitance of the capacitor. If this capacitor is connected to a 50 V supply, what is the charge on each plate of the capacitor?
(Absolute permittivity of free space = 8.85×10^{-12} Fm^{-1})

34. In the given circuit, calculate the current through the given galvanometer



35. An AC source of 200V, 50Hz is applied to a series LCR circuit in which R =3Ω, L= 25mH and C = 790 μF. Find a) the impedance of the circuit and b) the current in the circuit.

36. The refractive index of an equilateral prism is 1.532. Calculate the angle of minimum deviation when it is immersed in water of refractive index 1.33.

37. Calculate the binding energy and binding energy per nucleon of an alpha (α) particle in MeV from the following data. Mass of α-particle = 4.00260 u, Mass of neutron = 1.008662 u, Mass of proton = 1.007825 u