



JAIN COLLEGE, JAYANAGAR
II PUC Mock Paper -II
Subject : Physics (33)

Duration: 3 hrs 15 minutes

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 marks.

Part A

I. Answer all the following questions. 10x1=10

1. Charges of $5\mu\text{C}$ and $10\mu\text{C}$ are separated by a certain distance. Which charge repels the other with a greater force?
2. What happens to the balance condition when the galvanometer in a balanced Wheatstone's network is replaced by another of higher resistance?
3. A charged particle is found to experience a force both when it is static and while in motion in certain region. What is the kind of field present?
4. What is hysteresis?
5. State gauss's law in magnetization.
6. Which type of mirror is used by a dentist?
7. What is the de-Broglie wavelength of a particle at rest?
8. What is the series limit of a spectral series?
9. Define mass defect.
10. Define amplification.

Part B

II. Answer any five of the following questions. 5x2=10

11. Mention the properties of electric field lines.
12. Differentiate between terminal potential difference and emf.
13. Define self-inductance of a coil. Mention the factor on which self- inductance of a solenoid depends.
14. Define susceptibility. How susceptibility of a paramagnet does depends on temperature.
15. Mention the artificial source of microwaves and one application.
16. Draw the ray diagram of image formation in case of simple microscope.
17. Define the parameters α and β of a transistor.
18. Draw the block diagram of a generalized communication system.

Part C

III. Answer any five of the following questions. 5x3=15

19. Obtain an expression for potential energy of system of 3 charges.
20. Arrive at the expression for magnetic force on a current carrying conductor.
21. Define Earth's magnetic elements
22. Describe the coil-coil experiment to demonstrate electromagnetic induction.
23. Derive an expression for the instantaneous current through a circuit containing a capacitor and a source of AC.
24. What are polaroid's? Mention two applications.

25. Mention the limitations of Bohr's theory
26. Explain the formation of n-type semiconductor.

Part D

IV. Answer any two of the following questions. 2x5=10

27. Define potential? Obtain the expression for the potential due to point charge.
28. Obtain an expression for equivalent emf and equivalent internal resistance when two cells are connected in parallel?
29. Derive an expression for magnetic dipole moment of an electron in a hydrogen atom.

V. Answer any two of the following questions. 2x5=10

30. Obtain an expression for the refractive index of material of a prism.
31. Explain with diagram, the Davisson-Germer experiment on verification of the de-Broglie wavelength associated with electrons.
32. Discuss how energy bands are formed in solids and explain how solids are classified based on band theory.

Part E

VI. Answer any three of the following questions. 3x5=15

33. Two charges $10\mu\text{C}$ and $20\mu\text{C}$ are placed at the corners of the hypotenuse BC of a right angled triangle ABC of sides $AB=3\text{m}$ and $AC=4\text{m}$. Calculate the resultant electric field at the corner A.
34. Two resistors of 8Ω and 12Ω are connected in series across a battery of potential difference 10 volt. Calculate the current in the circuit, when another unknown resistance is connected in parallel with the two resistors across the same battery, the current in the circuit changes to 2.5 A. Calculate the unknown resistance.
35. An AC source of 220V, 50Hz is connected to a series combination of 20Ω resistor, $5\mu\text{F}$ capacitor and 2mH inductor respectively. Calculate the (a) Inductive reactance and capacitive reactance (b) Impedance (c) current (d) power factor.
36. In Young's double slit experiment the distance of the screen from the slits is 0.5m and the distance between the slits is 1.5mm. If the distance of the fourth bright fringe from the center of the screen is 0.8 mm. Calculate the wavelength of light used. What will be the distance of the fifth dark fringe from the central point on the fringe?
37. Calculate the energy released in Kilowatt hour when 0.2 kg of ${}_{92}\text{U}^{235}$ undergoes fission completely. Assume that the average energy released per fission of ${}_{92}\text{U}^{235}$ nucleus is 200MeV.
