



JAIN COLLEGE, J C Road Bangalore
Mock Paper -1, January - 2016
II PUC- Physics (33)

Time: 3 Hours 15 Minutes

Max. Marks: 70

- I. Answer ALL the questions** **1 × 10 = 10**
- 1 What is electrostatic shielding?
 - 2 Define mobility.
 - 3 Write the expressions for magnetic field due a toroid.
 - 4 Give the unit of magnetic flux.
 - 5 What is the peak value of ac having rms value 220 V?
 - 6 State malus law.
 - 7 How does stopping potential vary with intensity of incident light?
 - 8 Why nuclear fusion reaction is called as thermonuclear reaction?
 - 9 Draw the logic symbol of NAND gate.
 - 10 What are sky waves?
- II. Answer any FIVE of the questions** **2 × 5 = 10**
11. Draw a neat labeled diagram of Van de Graff generator.
 12. Derive $\sigma = ne^2\tau/m$
 13. What is declination and inclination?
 14. Mention any two applications of eddy currents.
 15. Give the expression for Maxwell-Ampere's law and explain the terms.
 16. Distinguish between interference and diffraction.
 17. Show that, $1\text{amu}=931\text{ MeV}$.
 18. Draw the block diagram of communication system.
- III. Answer any FIVE of the following** **3 × 5 = 15**
19. Derive an expression for electric field at a point outside the spherical conductor using Gauss's law.
 20. Derive an expression for equivalent resistance of two resistors when connected in parallel.
 21. State and explain Biot Savart's law.
 22. Derive an equation for motional emf.
 23. Mention any three advantages of ac over dc.
 24. Arrive at a relation between focal length and radius of curvature of a mirror.
 25. List out any three characteristics of nuclear forces.
 26. With a neat circuit diagram, explain Zener diode as a voltage stabilizer.
- IV. Answer any TWO of the following** **5 × 2 = 10**
27. Derive an expression for electric potential due to a dipole.
 28. Arrive at an expression for magnetic field for a bar magnet as an equivalent solenoid.
 29. Show that the voltage leads the current by $\pi/2$ when an inductor is connected to an ac.
- V. Answer any TWO of the following** **5 × 2 = 10**
30. Derive an expression for fringe width obtained in Young's double slit experiment.
 31. Derive an expression for radius of n^{th} orbit of hydrogen atom.
 32. With the neat diagram, explain the working of a transistor as an amplifier in CE mode.

VI. Answer any THREE of the following

5 × 3 = 15

33. A pendulum bob of mass 80 mg and carrying a charge of 20 nC is at rest in a horizontal uniform electric field of strength $20,000 \text{ NC}^{-1}$. Find the tension in the thread of the pendulum and the angle it makes with the vertical.
34. A uniform copper wire of length 2 m and cross-sectional area $5 \times 10^{-7} \text{ m}^2$ carries a current of 2 A. Assuming that there are 8×10^{28} free electrons per m^3 of copper; calculate the drift velocity of electrons. How long will an electron take to drift from one end of the wire to the other?
35. The magnetic fields at two points on the axis of a circular coil at distances 0.05 m and 0.2 m from the centre are in the ratio 8:1. Find the radius of the coil.
36. A ray of light is incident on one face of an equivalent prism of glass having refractive index 1.55 at an angle of 40° ; calculate the angle of deviation produced by the prism.
37. Light of frequency $8 \times 10^{15} \text{ Hz}$ is incident on a substance of photo electric work function 6.125 eV. Calculate the max velocity of the emitted photoelectrons.

Given: the mass of the electron = $9.1 \times 10^{-31} \text{ kg}$

Planck's constant = $6.625 \times 10^{-34} \text{ Js}$



JAIN COLLEGE, J C Road Bangalore
Mock Paper -2, January - 2016
II PUC- Physics (33)

Time: 3 Hours 15 Minutes

Max. Marks :70

- I. Answer all the questions:** **1 × 10 = 10**
- 1 Define equipotential surfaces.
 - 2 What is doping?
 - 3 Define half-life of a radioactive substance.
 - 4 How is energy of an electron related to the principal quantum number?
 - 5 Give the expression for magnification of a simple microscope for distinct vision.
 - 6 How many charges flow through a conductor to constitute a current of 2 A in 1 s?
 - 7 What is the significance of Lenz's law?
 - 8 How is capacitive reactance related to the frequency of the a.c. source?
 - 9 State Ampere's circuital law.
 - 10 What is the dip angle at the equator?
- II. Answer any five question:** **2 × 5 = 10**
11. Derive the expression relating electric field and electric potential.
 12. State Kirchhoff's junction rule and loop rule.
 13. State Faraday's laws of electromagnetic induction.
 14. What is electrical resonance? Give the expression for the resonant frequency
 15. Give two properties of electromagnetic waves
 16. What is hypermetropia? How it can be corrected?
 17. What are matter waves? Give the expression for De-Broglie wavelength.
 18. Draw the logic symbol of NOR gate and give its truth table.
- III. Answer any five questions:** **3 × 5 = 15**
19. Derive an expression relating refractive index and polarising angle.
 20. Derive the expression for force acting between two parallel current carrying straight conductors.
 21. Define ground wave, sky wave and space wave propagation.
 22. Derive an expression for the equivalent emf of two cells connected in parallel.
 23. Derive the expression for energy stored in an inductor.
 24. Explain the working of an n-p-n transistor.
 25. What is photoelectric effect? Explain the effect of (a) intensity and (b) frequency of the incident light on photoelectric current with the help of graphs.
 26. State and explain Coulomb's law in electrostatics.
- IV. Answer any two questions:** **2 x 5 = 10**
27. Differentiate between diamagnetic, paramagnetic and ferromagnetic materials.
 28. Define impedance. Using a phasor diagram derive the expression for impedance in a series LCR circuit.
 29. Derive an expression for capacitance of a parallel plate capacitor. What is the effect on its capacitance when a dielectric is inserted between the plates?
- V. Answer any two questions:** **2 × 5 = 10**
30. Derive the lens maker's formula.
 31. State radioactive decay law. Derive the expression $N=N_0e^{-\lambda t}$.
 32. On the basis of energy band theory, differentiate between metals, semiconductors and insulators.

VI. Answer any three questions:

3 × 5 = 15

33. Two point charges of $+16 \mu\text{C}$ and $-9 \mu\text{C}$ are placed 8 cm apart in air. Determine the position of the point at which the resultant electric field is zero.
34. Two cells of emf's 4.5 V and 6 V and internal resistance 6Ω and 3Ω respectively have their negative terminals joined by a wire of resistance 18Ω and positive terminals joined by a wire of 12Ω resistance. A third wire of resistance 24Ω connects middle points of these two wires. Find the potential difference across this third wire.
35. A galvanometer of resistance 50Ω gives full scale deflection for a current of 0.05 A. Calculate the length of the shunt wire required to convert the galvanometer into an ammeter of range 0.5 A. The diameter of the shunt wire is 2 mm and its resistivity is $5 \times 10^{-7} \Omega\text{m}$.
36. An air bubble is in a sphere of radius 8 cm and refractive index 1.6. When seen along the diameter, the bubble appears to be 2 cm inside the sphere. Find the location of the bubble.
37. If the limit wavelength of the Lyman series for hydrogen atom is 912 \AA , then calculate the series limit wavelength for the Balmer series of hydrogen.

