



SRI BHAGAWAN MAHAVEER JAIN COLLEGE

Vishweshwarapuram, Bangalore.

Mock Question Paper 1 – January 2020

Course: II year PUC

Subject: Physics

Max. Marks: 70

Duration: 3.15hrs.

PART-A

I. Answer ALL the following questions.

10x1=10

1. How many electrons make 1nC of charge?
2. Define resistivity of a material of a conductor.
3. What is the nature of force between two parallel conductors carrying currents in the opposite directions?
4. What happens to self-inductance of a coil if a ferromagnetic material is inserted inside the coil?
5. Name the electromagnetic radiation with longest wavelength.
6. Give the SI unit of power of a lens.
7. Name the angle of incidence at which reflected ray is completely plane polarized.
8. Give the relation between mean life and half-life of a radioactive substance.
9. Write the circuit symbol for p-n junction diode.
10. Name the experiment which confirms the wave nature of electrons.

PART-B

II. Answer any FIVE of the following questions.

5x2=10

11. Mention any two properties of electric field lines.
12. Write the vector form of Biot-Savart's law and explain the terms.
13. State and explain Gauss's law in magnetism.
14. The magnetic flux linked with a coil changes from 12×10^{-3} Wb to 6×10^{-3} Wb in 0.01 seconds. Calculate the emf induced in the coil.
15. Show that current and voltage are in phase in an AC circuit containing a pure resistor.
16. Give any two uses of X-rays.
17. Distinguish between interference and diffraction patterns.
18. What are isotopes? Give example.

PART-C

III. Answer any FIVE of the following questions.

5x3=15

19. Derive the expression for the effective capacitance of a series combination of two capacitors.
20. What is resistance of a conductor? Mention the factors on which it depends.
21. Deduce the expression for magnetic field due to a long straight current carrying wire using Ampere's circuital law.
22. What is a toroid? Write the expression for magnetic field inside the toroid, along its axis and explain the terms.
23. What are eddy currents? Mention any two applications of eddy currents.
24. Define critical angle and mention the conditions for total internal reflection to occur.
25. Distinguish between nuclear fission and nuclear fusion.
26. What is light emitting diode? Mention any two uses of it.

PART-D

IV. Answer any TWO of the following questions.

2x5=10

27. State Gauss's law in electrostatics. Derive an expression for the electric field at a point due to an infinitely long straight charged conductor.
28. Obtain an expression for effective emf and internal resistance of two cells connected in series.
29. Show that a bar magnet is equivalent to a current carrying solenoid.

V. Answer any TWO of the following questions.

2x5=10

30. Using Huygens wave theory of light derive Snell's law of refraction.
31. Derive an expression for total energy of an electron in hydrogen atom assuming the radius of the orbit.
32. What is a zener diode? With a neat diagram explain the working of zener diode as a voltage regulator.

V. Answer any THREE of the following questions.**3x5=15**

33. Point charges of $+2\text{nC}$, $+4\text{nC}$ and $+8\text{nC}$ are placed at the corners A, B and C respectively of a square ABCD of side 0.2m . Calculate the work done in transferring a charge of 2nC from D to the centre of the square.
34. 100mg mass of nichrome metal is drawn into a wire of area of cross section 0.05 mm^2 . Calculate the resistance of this wire. Given density of nichrome is $8.4 \times 10^3\text{ kgm}^{-3}$ and resistivity of the material is $1.2 \times 10^{-6}\text{ }\Omega\text{ m}$.
35. Calculate the resonant frequency, Q-factor and bandwidth of a series LCR circuit containing a pure inductor of 0.4H and a capacitor of $0.01\text{ }\mu\text{F}$ and a resistor of resistance $600\text{ }\Omega$.
36. A prism is made of glass of unknown refractive index. A parallel beam of light is incident on one face of the prism. The angle of minimum deviation is measured to be 40° . What is the refractive index of the material of the prism? The refracting angle of the prism is 60° . If the prism is placed in water of refractive index 1.33 , predict the new angle of minimum deviation.
37. Monochromatic radiation of wavelength 640.2nm from a neon lamp irradiates a photo-sensitive material made of calcium. The stopping potential is measured to be 0.54V . If radiation of wavelength of 427.2nm from another source irradiates the same photo-sensitive material. Calculate the new stopping potential.
