



# JAIN COLLEGE

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Bangalore - 560 098

Date:

**SUBJECT: PHYSICS**

**II PUC  
Mock Paper-II**

**Timings Allowed: 3 Hrs 15 Minutes**

**Total Marks: 70**

## GENERAL INSTRUCTIONS:

- All parts are compulsory.
- Draw relevant diagram/figure wherever necessary.
- Numerical problems should be solved with relevant formula.

### PART-A

**I Answer ALL the following questions:-**

**10x1=10**

1. What is the charge on  ${}_{11}\text{N}^{22}$  nucleus?
2. What is the reciprocal of resistance?
3. Give one use of cyclotron.
4. North Pole of a bar magnet is moved towards a metal ring. What is the direction of induced current in the ring when viewed from magnet side?
5. Define linear magnification for a lens.
6. Define critical angle.
7. What is the significance of -ve sign in the expression for energy of an electron moving in a nucleus of hydrogen atom?
8. Output of an AND gate is connected to the input of a NOT gate. Name the equivalent logic Gate.
9. Mention one application of photodiode.
10. What is amplitude modulation?

### PART-B

**II Answer any FIVE of the following questions:-**

**5x2=10**

11. Define electric flux. Draw the electric field lines for a system of two opposite charges.
12. a) Define electron mobility.  
b) Mention one limitation of Ohm's law.
13. Mention the expression for power loss in a conductor and explain the terms used.
14. Explain the terms retentivity and coercivity.
15. How does the magnetic potential energy stored in a coil carrying current vary with the  
a) Self-inductance  
b) Current in the coil
16. Give two properties of electromagnetic waves.
17. Two nuclei have mass numbers in the ratio 8:125. Calculate the ratio of their nuclear radii.
18. Give two reasons for the need of modulation.

### PART-C

**III Answer any FIVE of the following questions:-**

**5x3=15**

19. Obtain the expression for capacitance of a parallel plate capacitor without dielectric medium.
20. Arrive at the expression for equivalent resistance when two resistors are connected in parallel.
21. State and explain Gauss's law in magnetism.
22. Define mutual inductance between a pair of coils. On what factors does it depend?
23. Show that voltage and current are in phase with each other when an AC voltage is applied across a resistor. Represent this relation in phasor diagram.
24. Derive the expression for Brewster's law.
25. State Bohr's Postulates.

26. Draw the transfer characteristics for A transistor in CE mode and  
(a) Indicate the relevant region of operation.  
(b) In which region is the transistor is used as an amplifier.  
(c) Under which condition does it works as (i) open switch (ii) closed switch

**PART-D**

**IV Answer any TWO of the following questions:-** **2x5=10**

27. Derive the expression for electric field at any point on the equatorial line of an electric dipole.  
28. Derive the balancing condition for Wheatstone's bridge. Name the device which works on the principle of Wheatstone bridge.  
29. Describe magnetic hysteresis with a neat diagram.

**V Answer any TWO of the following questions:-** **2x5=10**

30. Derive the expression for the Refractive Index of the material of a prism in terms of angle of the prism and the angle of minimum deviation  
31. Give Einstein's photoelectric equation. Mention the experimental observation of Einstein's Photoelectric effect.  
32. Draw the input and output characteristics of n-p-n transistor in CE mode. Hence define the terms  
a) Input resistance b) Output resistance c) Current amplification factor

**PART-E**

**VI Answer any THREE of the following questions:-** **3x5=15**

33. ABCD is a square of side 1m. Charges  $+2 \times 10^{-10} \text{C}$ ,  $-4 \times 10^{-10} \text{C}$  and  $+8 \times 10^{-10} \text{C}$  are placed at the corners A, B and C respectively. Calculate the amount of work done in transferring a charge of  $10 \mu\text{C}$  from D to the point of intersection of diagonals.  
34. The magnetic fields at two points on the axis of a circular coil at a distance 0.05m and 0.2m from the centre are in the ratio 8:1. Find the radius of the coil.  
35. An alternating emf of 220V, 50 Hz is applied to a circuit having resistance of  $200 \Omega$ , inductance 4H and capacitance  $2 \mu\text{F}$  in series. Calculate the impedance of the circuit and the maximum current in the circuit.  
36. In a Young's double slit experiment, the distance between the slits is 1mm. Fringe width is found to be 0.6mm. When the screen is moved through a distance of 0.25m away, the fringe width becomes 0.75mm. Find the wavelength of light used.  
37. A given coin has a mass of 3.0g. Calculate the nuclear energy that would be required to separate all the neutrons and protons from each other. The coin is entirely made of  $^{29}\text{Cu}_{63}$  atoms of mass 63.9260u.

Given: Avagadro no. =  $6.023 \times 10^{23}$ ; Mass of proton = 1.00727u; Mass of neutron = 1.00866u

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