SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **Mock Exam 2 - Feb. 2016**		**Course:**	II PUC
		Subject:	**Physics**
		Max. Marks:	70
		Duration:	3.15Hrs.

PART-A

I. Answer ALL the following questions. 10 x 1 = 10

1. Force between two point charges kept at a distance d in air is F . If these charges are kept at the same distance in water, how does the force between them change?
2. What is the resistance of $100W$, $200V$ lamp, when not in use?
3. How does a diamagnetic substance align when suspended freely in a uniform magnetic field?
4. What is the phase relation between electric and magnetic fields in an electromagnetic wave?
5. Write the expression for displacement current.
6. What are coherent sources?
7. Define impact parameter.
8. How does the mass number change when a nucleus undergoes $\beta-$ decay?
9. What is the role of a moderator in the nuclear reactor?
10. Write the circuit symbol of npn transistor.

PART - B

II. Answer any FIVE of the following questions. 5 x 2 = 10

11. A capacitor is charged with a battery and then the separation between the plates is increased without disconnecting from the battery. What will be the change in the charge stored and the potential difference across the plates of the capacitor?
12. A resistor has the colour of different bands in the order yellow, violet and blue. What is its resistance and tolerance?
13. Give an expression for the torque experienced by a rectangular current loop placed in a uniform magnetic field? When is it maximum?
14. Explain the principle of conservation of energy in Lenz' law.
15. Define resolving power of a microscope. How does the resolving power vary along with the increase in wavelength of light used?
16. Give any two types of electron emission.
17. Write the circuit symbol and truth table of AND gate.
18. What is an extrinsic semiconductor? What type of semiconductor is obtained when silicon is doped with phosphorus?

PART - C

III. Answer any FIVE of the following questions. 5 x 3 =15

19. Mention the properties of electric field lines.
20. What is hysteresis? Draw a hysteresis loop showing coercivity and retentivity.
21. Write the expression for the time period of oscillation of small compass needle in a uniform magnetic field and explain the terms. How does the time period change when the magnitude of magnetic field is reduced to $\frac{1}{4}^{th}$ of its original value?
22. What is a transformer? Give any two sources of energy loss in the transformer.
23. Draw a ray diagram for the image formed at near point in case of a compound microscope. Give the expression for the magnifying power of the same.
24. What are matter waves? Derive the expression for de-Broglie wavelength.

25. Mention any three characteristics of nuclear forces.
26. What is amplitude modulation? Draw a block diagram of AM receiver.

PART - D

IV. Answer any TWO of the following questions. 2 x 5 = 10

27. Using Gauss' law, derive an expression for the electric field at a point on the axis of electric dipole.
28. State Ohm's law. Deduce Ohm's law in vector form.
29. What is a cyclotron? With a neat and labelled diagram, explain the construction and working of a cyclotron.

V. Answer any TWO of the following questions. 2 x 5 = 10

30. Derive an expression for the impedance in an LCR circuit using phasor diagram.
31. Obtain an expression for the refractive index of the material of the prism in terms of angle of prism and angle of minimum deviation.
32. Explain the formation of energy bands in solids. On the basis of energy bands, distinguish between conductor, insulator and semiconductor.

VI. Answer any THREE of the following questions. 3 x 5 = 15

33. Two capacitors of capacitances $1\mu F$ and $3\mu F$ are charged to $800V$ and $400V$ respectively. Find the common potential difference, the charge on each capacitor and the energy dissipated when they are connected in parallel.
34. Two cells of emf $3V$ and $2V$ and internal resistances 1.5Ω and 1Ω are connected in parallel across 3Ω resistor such that they tend to send current through the resistor in the same direction. Calculate the potential difference across 3Ω resistor.
35. A square loop of side $10cm$ and resistance 0.7Ω is placed vertically in east-west plane. A uniform magnetic field of $0.10T$ is set up across the plane in north-east direction. The magnetic field is decreased to zero in $0.70s$ at a steady rate. Determine the magnitude of induced emf and current during this time interval.
36. In a double slit experiment, the width of the bright fringes obtained with light of wavelength $600nm$ is $0.4mm$. Find the fringe width, if the entire apparatus is immersed in water of refractive index 1.33.
37. The series limit of hydrogen spectrum in the visible region is $364.6nm$. Calculate the longest wavelength of the series and the frequency of the corresponding line.

****