RN **II P.U.C. PREPARATORY EXAMINATION, JAN. -2018** II

Time : 3.15 Hours | **PHYSICS- 33** | Max. Marks : 70

PART-A

I Answer all the questions :- **10x1=10**

1. What is the permittivity of a medium whose dielectric constant is one?
2. Draw Equipotential surface due to a single point charge.
3. Write colour code of the resistor whose resistance is 450 $\Omega \pm 10\%$.
4. For which class of magnetic material, magnetic susceptibility is small and negative value?
5. Define dip.
6. What is the cause of dispersion of light?
7. State Brewster's Law.
8. What is the effect on wavelength of matter wave if the momentum of moving particle increases?
9. Draw the logic symbol for NAND gate.
10. Mention the Value of band width for transmission of signal in coaxial cable.

PART-B

II Answer any FIVE of the following questions: **5x2=10**

11. What is an Electricdipole? Give the S.I. unit of dipole moment.
12. How does the electrical conductivity vary when the temperature rises in (a) metal (b) semiconductor?
13. Write any two uses of Cycltron.
14. What is displacement current? Write the expression for it.
15. Write the two conditions for total internal reflection.
16. Write any two observations of α-particle scattering experiment.
17. Give two differences between nuclear fission and nuclear fusion.
18. Draw a block diagram for communication system.

PART-C

III answer any FIVE of the following question: **5x3=15**

19. Obtain the expression for effective capacitance of parallel combination of two capacitors.
20. How a moving coil galvanometer is converted into Voltmeter? Explain with the circuit diagram.
21. Write any three properties of paramagnetic materials.
22. Derive an expression for current when an AC voltage applied to a resistor.
23. Using Huygen's principle derive snell's law for refraction.
24. Describe de-Broglie explanation of Bohr's second postulate of quantization.
25. What is alpha decay? Explain with an example.
26. Give three differences between n-type & p-type semiconductor.

PART-D

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

27. Using Gauss's Law, Derive an expression for electric field due to a uniformly charged infinite plane sheet.
28. State ohm's law. Derive $J = \sigma E$.
29. Derive an expression for magnetic field at the center of a circular coil carrying current, using Biot- Savart's law.

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

30. Arrive at the conditions for constructive and destructive interference of two waves with equal amplitude.

31. State and derive law of radioactive decay.

32. With the help of circuit diagram, explain the working of p-n junction diode as a full-wave rectifier. Show the input and output wave forms.

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

33. TWO point charges + 2nc and –4nc are 1m apart in air. Find the positions along the line joing the two charges at which the resultant potential is zero.

34. Two cells of emf 4v and 2v and internal resistances 2Ω and 1Ω respectively are connected in parallel so as to send the current in the same direction through an external resistance of 10 Ω. Find the potential difference across 10Ω resistor.

35. A series RC circuit with 30Ω resistance 250 μF capacitance is connected to A.C. supply of 220V, 50Hz. Find the current in the circuit and potential difference across the resistor and the capacitor.

36. Light from a point source in air falls on a spherical glass of Refractive index 1.5 and radius 20cm. The distance of the light source from the glass surface is 100cm. At what position will the image will be formed. Find its magnification?

37. Calculate the maximum velocity of photo electron, if the work function of the target matel is 1.8ev and wavelength of incident light is 400nm. What is retarding potential to stop the fastest electrons reaching the collector?