

**Part-III**  
**PHYSICS**  
**Paper – II**  
**(English Version)**

**Time : 3 Hours**

**Max. Marks : 60**

**SECTION – A**

**(10x2=20)**

**Note : (i) Answer ALL questions.**

**(ii) Each question carries TWO marks.**

**(iii) ALL are very short answer type questions.**

1. What focal length should the reading spectacles have for a person for whom the least distance of distinct vision is 50 cm?
2. Distinguish between ammeter and Voltmeter
3. A magnetic d pole placed in magnetic field experiences a net force. What can you say about the nature of the magnetic field?
4. What happens to compass needles at the Earth's poles?
5. When does a LCR series circuit have minimum impedance?
6. If the wavelength of electromagnetic radiation is doubled. What happens to the energy of photon?
7. What important fact did Millikan's experiment establish?
8. An electron, an  $\alpha$ -particle and a proton have the same kinetic energy. Which of these particles has the shortest de Broglie wavelength?
9. What is a p-type semiconductor? What are the majority and minority charge carriers in it?
10. What is sky wave propagation?

**SECTION –B**

**(6x4=24)**

**Note : (i) Answer ANY SIX questions.**

**(ii) Each question carries FOUR marks.**

**(iii) ALL are short answer type questions.**

11. Define critical angle. Explain total internal reflection using a neat diagram 12. Explain Doppler effect in light. Distinguish between red shift and blue shift
13. Perive the equation for the couple acting on an electric dipole in uniform electric field.
14. Derive an expression for the electric potential due to a point charge
15. Derive an expression for the magnetic dipole moment of a revolving electron
16. Obtain an expression for the magnetic energy stored in a solenoid in terms of the magnetic field, area and length of the solenoid.
17. Explain the different type of spectral series.
18. Define NAND and NOR gates. Give their truth tables,

#### **SECTION –C**

**(2x8=16)**

**Note : (i) Answer ANY TWO questions.**

**(ii) Each question carries EIGHT marks.**

**(iii) ALL are long answer type questions.**

19. How are stationary waves formed in closed pipes? Explain the various modes of vibrations and obtain relations for their frequencies. A closed organ pipe 70 cm long is sounded. If the velocity of sound is 331 m/s, what is the fundamental frequency of vibrations of the air column?
20. State the working principle of potentiometer. Explain with the help of circuit diagram how the emf of two primary cells are compared by using the potentiometer. A potentiometer wire is 5m long and a potential difference of 6V is maintained between its ends. Find the emf of a cell which balances against a length of 180 cm of the potentiometer wire.
21. Explain the source of stellar energy. Explain the carbon-nitrogen cycle, proton - proton cycle occurring in stars.

THE END