

(6)

## PHYSICS - 2011

Answer Five question. First question is compulsory.  
Answer any FOUR from the remaining Seven.

1. a) State and explain third law of thermodynamic. (3)  
b) Maxwell equations (4)  
c) Photoelectric effect (3)  
d) Distinguish between Fresnel's and Fraunhofer's diffraction. (5)
2. a) State and explain Second law of thermodynamics. What is its significance?  
b) What is entropy? Explain entropy and disorder. (6)
3. a) State Ampere's law. Derive an expression for the magnetic field inside a solenoid carrying current. (8)  
b) Derive an expression for the torque on a current loop kept in a magnetic field. (6)
4. a) What is Hall Effect? What information do you get from Hall effects studies? (7)  
b) Discuss the concept of displacement current is same as that of conduction current. (7)
5. a) Obtain the conditions for the interference of light reflected by a thin film. (6)

b) Explain the phenomena of double refraction. (5)

c) In a Newton's rings experiment the diameter of the 5th dark ring was 0.3 cm and the diameter of the 25th ring was 0.8 cm. If the radius of curvature of the convex lens is 100 cm, find the wavelength of the light used. (2)

6. a) What is meant by population inversion and how is it achieved in practice? (4)

b) Describe the construction and working of Ruby laser with a neat diagrams. Give some applications of lasers. (10)

7. a) Give an account of applications of fiber sensors. (4)

b) Describe an acoustic grating and show that it can be used to determine the velocity of waves in liquid. Give some applications of ultrasonic (10)

8. a) Derive Schrodinger time independent wave equation. (8)

b) Distinguish between Type-I and Type-II superconductors. (6)