

SECTION-B

2. (a) Using Maxwell's equations, obtain the equations of electric and magnetic waves propagating in free space.
(b) Discuss various polarizations induced in the dielectric when it is subjected to external electric field. (4,4)
3. (a) Write a short note on ferrites and their applications.
(b) Give a brief account of Type I and II superconductors. (4,4)
4. (a) Discuss the principle and working of semiconductor lasers.
(b) What is the role of Helium gas in lasing action in He-Ne laser. Give the wavelength of output radiation. (5,3)
5. (a) Discuss pulse and material dispersion observed in optical fibers. How is pulse dispersion minimized?
(b) Write a note on the applications of optical fibers. (5,3)

SECTION-C

6. (a) Derive the expression for variation of mass with velocity for a relativistic particle.
(b) Why was concept of ether introduced and what properties were assigned to it? (6,2)
7. (a) When x-rays propagate through a medium, discuss various processes through which it suffers attenuation in its intensity.
(b) Derive Bragg's law and discuss its applications in crystallography. (4,4)
8. (a) Discuss the Born's interpretation of wave function.
(b) A particle of mass m is trapped in one dimensional potential well of infinite depth. Find its normalised wave functions and quantized energies. (4,4)
9. (a) Write a note on superconductivity with emphasis on magnetic and thermodynamic properties.
(b) Write down London's equations and give their physical significance. (4,4)