Code No: 151AE

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question
carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Explain wave particle duality.	[2]
b)	Define diffusion and drift mechanisms.	[2]
c)	Illustrate about LED materials.	[2]
d)	What is coherence?	[2]
e)	What are piezoelectric materials?	[2]
f)	Explain about Heisenberg's uncertainty principle.	[3]
g)	What is Fermi level?	[3]
h)	Illustrate working of a PIN diode.	[3]
i)	Explain losses in optical fibers.	[3]
j)	Define ampere's and Faraday's law.	[3]

PART – B

(50 Marks)

2.a)	Discuss about de Broglie's hypothesis.	
b)	Prove de Broglie's hypothesis using Davission and Germer's experiment.	[5+5]
	OR	
3.a)	Derive an expression for time independent Schrodinger's wave equation.	
b)	Explain the Born interpretation of wave function.	[5+5]
4.a)	Estimate concentration of electrons in n-type semiconductor.	
b)	Evaluate I-V characteristics of a pn-junction diode.	[5+5]
	OR	
5.a)	Explain the phenomena of carrier generation and recombination.	
b)	Discuss about working, IV characteristics of Zener diode.	[5+5]
6.a)	Compare radiative and non-radiative recombination mechanisms.	
b)	Explain figures of merits of a LED device.	[5+5]
	OR	
7.a)	Discuss about construction, principle and working of a semiconductor laser.	
b)	Evaluate working of a solar cell in terms of characteristics.	[5+5]

8.a)	Explain interaction of radiation with matter.	
b)	Discuss working principle and applications of Ruby laser.	[5+5]
	OR	
9.a)	Derive an expression for numerical aperture of an optical fiber.	
b)	Compare working of step index and graded index fibers.	[5+5]
10.a)	Write a note on Maxwell's equations.	
b)	Explain classification of magnetic materials.	[5+5]
	OR	
11.a)	Derive an expression for internal fields in a solid.	
b)	Discuss about hysteresis behavior of ferromagnetic material.	[5+5]