R16

Code No: 131AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year I Semester Examinations, January/February - 2024
ENGINEERING PHYSICS
(Common to CE, ME, AE, MSNT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What is Diffraction?	[2]
b)	Explain spatial and temporal coherence.	[3]
c)	Distinguish between polarizer and analyzer.	[2]
d)	Explain how a laser light is different to normal light.	[3]
e)	What is total internal reflection?	[2]
f)	List out applications of optical fibers.	[3]
g)	What is Space lattice?	[2]
h)	Calculate packing fraction of SCC.	[3]
i)	List out few uses of crystal defects.	[2]
j)	What are grain boundaries defect?	[3]

PART - B

(50 Marks)

2.a)	Describe determination of liquid refractive index of a given source using Newton's rings experiment.	
b)	Describe Fraunhoffer diffraction due to N- slits.	[5+5]
	OR	
3.a)	Distinguish between Fresnel and Fraunhoffer diffraction.	
b)	Derive an expression for interference in thin films due to reflected light.	[5+5]
4.a)	Explain the following: (i) Malus's law (ii) Double refraction.	
b)	Describe the construction and working of Ruby laser.	[5+5]
	OR	
5.a)	Distinction between Quarter wave and half wave plates.	
b)	Obtain expression for energy density in terms of Einstein's A & B coefficient.	[5+5]
6.a)	What is attenuation? Explain different types of attenuation in optical fiber.	
b)	Distinguish between single mode step index and multi mode step index optical fibers.	[5+5]
	OR	
7.a)	Derive an expression for Acceptance angle and Numerical Aperture	
b)	Explain basic principle and construction of optical fiber.	[5+5]

8.a) Discuss Diamond structure and also estimate its packing fraction.

b) Show that packing fraction of FCC is more than SC and BCC crystals. [5+5]

OR

9.a) Derive an expression for inter-planar spacing of cubic crystal systems.

b) With neat diagram explain Bravais lattices. [5+5]

10.a) What is Burger's vector, and how does it play a crucial role in describing and understanding the dislocation movement in crystal structures?

b) Show that $2d\sin\theta = n\lambda$. [5+5]

OR

11.a) Explain the following surface defects: (i) stacking faults (ii) twin (iii) tilt.

b) What are point defects? Explain in detail of point defects. [5+5]

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