Code No: 131AC

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year I Semester Examinations, December - 2016
ENGINEERING PHYSICS
(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

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, c as sub questions.

PART- A

(25 Marks)

1.a)	Explain the concept of coherence.	[2]
b)	Distinguish between Fresnel and Fraunhoffer diffraction.	[3]
c)	Discuss the concept of double refraction.	[2]
d)	Explain in brief about the stimulated emission.	[3]
e)	Discuss about the principle of an optical fiber.	[2]
f)	Define acceptance angle and numerical aperture.	[3]
g)	Write a short note on miller indices.	[2]
h)	Define space lattice, lattice parameters and coordination number.	[3]
i)	Write a short note on point defects.	[2]
j)	State and explain Bragg's law.	[3]

PART-B

(50 Marks)

2.a) Explain the concepts of division of wave front and amplitude with proper examples.

b) Discuss about experimental setup of Newton's rings experiment and derive an expression for radius of curvature of plano-convex lens. [4+6]

OR

3.a) Derive the condition for diffraction due to single slit and extend it to N-slits.

b) Explain diffraction grating experiment. [5+5]

4.a) Describe the construction, principle and working of Nicol prism.

b) Describe the principle of quarter and half wave plates. [5+5]

OR

5.a) Establish the relation between Einstein's coefficients.

b) Describe the principle, construction and working of Ruby laser. [5+5]

6.a) What are the reasons for attenuation in optical fibers? Explain.

b) Obtain an expression for acceptance angle in an optical fiber. [5+5]

OR

7.a) Write in detail about step index and graded index fibers.

b) Explain the construction of optical fiber. Write any three applications of optical fibers. [5+5]

8.a) Describe seven crystal systems and their corresponding Bravias lattice.

b) Derive the expression for inter planar spacing of orthogonal crystal system. [5+5]

OR

9.a) Define atomic radius and packing fraction.

b) Estimate the packing fractions of BCC, FCC and HCP crystals. [4+6]

10.a) Describe powder diffraction method to determine the structure of a unit cell.

b) Calculate concentration of Frenkel defects at a given temperature. [5+5]

OR

11.a) Describe the Laue method of X-ray diffraction and mention the limitations.

b) What are line defects? Explain Burger's vector. [5+5]

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