

**Code No: 131AH****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year I Semester Examinations, May/June - 2019****ENGINEERING PHYSICS - I****(Common to EEE, ECE, CSE, EIE, IT, ETM)****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) Define temporal and spatial coherence. [2]
- b) Explain the significance of beam splitter in Newton's rings experiment. [3]
- c) Write applications of nicol prism. [2]
- d) What is the importance of population inversion? [3]
- e) What is total internal reflection? Explain. [2]
- f) Write any four applications of optical fibers. [3]
- g) Define space lattice, unit cell and lattice parameters. [2]
- h) Calculate packing fraction of simple cube. [3]
- i) State and explain Bragg's law. [2]
- j) Discuss about line defects. [3]

**PART-B****(50 Marks)**

- 2.a) Explain interference in thin films in reflected light.
- b) Describe experimental setup of Newton's rings experiment and obtain expression for radius of curvature of plano-convex lens. [5+5]

**OR**

- 3.a) Compare Fresnel's and Fraunhofer diffraction.
- b) Discuss in detail about diffraction grating experiment. [5+5]

- 4.a) Describe construction and working of a nicol prism.
- b) Establish relation between Einstein's coefficients. [5+5]

**OR**

- 5.a) Write in detail about quarter and half wave plate.
- b) Discuss about construction and working of Ruby laser. [5+5]

- 6.a) Derive an expression for acceptance angle and numerical aperture.
- b) Discuss about transmission of light in step index and graded index fibers. [5+5]

**OR**

- 7.a) Discuss about construction and principle of optical fiber with the help of neat diagram.
- b) Describe various types of losses in optical fibers. [5+5]

8.a) Discuss about seven crystal systems and their corresponding Bravais lattice with the help of neat diagrams.

b) Discuss about HCP and diamond structures. [5+5]

**OR**

9.a) Explain salient features of miller indices.

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

10.a) Give an account of point defects.

b) Derive an expression for the concentration of Schottky defects at a given temperature. [5+5]

**OR**

11.a) Discuss about powder method of X-ray diffraction with the help of neat diagram.

b) Explain the significance of Burger's vector. [5+5]

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