

R16

Code No: 131AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech I Year I Semester Examinations, December - 2016****ENGINEERING PHYSICS-I****(Common to EEE, ECE, CSE, EIE, IT)****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) What do you understand by division of wave front? [2]
- b) Monochromatic light of wavelength 6400 \AA falls normally on a grating 3cm wide. The second order spectrum is produced at an angle of 30° from the normal. Find the number of lines per cm on the grating. [3]
- c) What is a half wave plate? [2]
- d) Distinguish between spontaneous and stimulated emission. [3]
- e) Define the terms numerical aperture and acceptance cone. [2]
- f) What are the characteristics of a step index fiber? [3]
- g) In a cubic unit cell show the (101) and (110) planes. [2]
- h) Calculate the packing factor of BCC and HCP lattices. [3]
- i) What is Frenkel defect? [2]
- j) What are line defects? [3]

PART-B**(50 Marks)**

- 2.a) Explain the theory of interference in thin films by transmitted light.
 - b) Describe the diffraction grating experiment to determine the wave length of light source. [5+5]
- OR**
- 3.a) Describe Newton's rings experiment to determine the radius of curvature of a plano - convex lens.
 - b) Explain the theory of N - slit diffraction. [6+4]
- 4.a) State Malus's law. Explain the working of a half wave plate.
 - b) Describe the construction and working of He - Ne laser. [4+6]
- OR**
- 5.a) Explain the phenomenon of double refraction with the help of a diagram.
 - b) Describe the construction and working of semiconductor laser. [5+5]

- 6.a) Describe the principle of propagation of light signal through a fiber.
b) Explain the applications of fibers in medicine and as sensors. [5+5]

OR

- 7.a) Derive the expressions for Numerical aperture and Acceptance angle in fibers.
b) Explain in detail about the reasons for attenuation in fibers. [5+5]

- 8.a) What are Miller indices? Explain the steps involved in indexing a plane.
b) Explain the seven crystal systems with neat diagrams. [5+5]

OR

- 9.a) Describe the Bravais lattices with neat diagrams.
b) Deduce the relation between inter planar spacing and lattice parameters of an orthogonal system. [5+5]

- 10.a) Describe the Laue method to determine the structure of a unit cell.
b) State and explain Bragg's law. [5+5]

OR

- 11.a) Describe the powder method of X-ray diffraction to calculate the lattice constant of a cubic system.
b) What is Burger's vector? Explain stacking faults and grain boundaries. [5+5]

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