Code No: 131AH

R16

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 A^0 falls normally on a grating 3cm wide. The
    second order spectrum is produced at an angle of 30^0 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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