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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