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Code No: 131AH

**R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May - 2018

ENGINEERING PHYSICS-I

(Common to EEE, ECE, CSE, EIE, IT, ETM)

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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.

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(25 Marks)

- 1.a) Explain basic difference between division of amplitude and division of wave front. [2]
- b) Describe the properties of Fraunhofer diffraction. [3]
- c) Write short notes on double refraction. [2]
- d) Discuss about stimulated emission. [3]
- e) Explain construction of optical fiber. [2]
- f) Discuss about attenuation in optical fibers. [3]
- g) Write salient features of miller indices. [2]
- h) Calculate packing factor of diamond. [3]
- i) Write short notes on Burger's vector. [2]
- j) Write short notes on point defects. [3]

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(50 Marks)

- 2.a) Explain interference in thin films in transmitted light.
- b) Give an account of grating experiment. [5+5]

OR

- 3.a) Explain Fraunhofer diffraction due to single slit and extend it to N-slits.
- b) Discuss in detail about spatial and temporal coherence. [5+5]

- 4.a) Discuss about the characteristics of lasers.
- b) Describe principle, working and construction of semiconductor lasers. [5+5]

OR

- 5.a) Give an account of absorption, spontaneous and stimulated emission.
- b) Explain principle and working nicol prism.
- c) Write any four applications of lasers. [10]

- 6.a) Explain the use of fiber optic cables in communication system.
- b) Obtain an expression for numerical aperture.
- c) Write any four applications of fiber optics in medicine. [10]

OR

- 7.a) Discuss about construction and principle of optical fiber with the help of neat diagrams.
- b) Write in detail about step index and graded index fibers. [5+5]

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- 8.a) Define atomic radius, coordination number and packing fraction.  
b) Explain classification of crystals based on the lattice parameters.  
c) Write short notes on Miller indices.

[10]

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- 9.a) Prove that FCC is closely packed when compared to bcc and sc.  
b) Write short notes on HCP and crystal planes and directions.

[5+5]

- 10.a) Discuss about line defects and also explain the significance of Burger's vector.  
b) Discuss about determination of crystal structure by Laue method.

[5+5]

OR

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- 11.a) Give an account of vacancies, substitutional, interstitial defects.  
b) Estimate concentration of Frenkel defects at a given temperature.

[5+5]

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