

R16

Code No: 131AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, December - 2017

ENGINEERING PHYSICS

(Common to CE, ME, MCT, MMT, AE, MIE, PTM, CEE, MSNT)

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 are the conditions for coherence?                                | [2] |
| b)   | Distinguish between Fresnel and Fraunhofer diffraction.               | [3] |
| c)   | State Malu's law.   | [2] |
| d)   | Distinguish between spontaneous and stimulated emission of radiation. | [3] |
| e)   | Define the terms numerical aperture and acceptance angle.             | [2] |
| f)   | What are the applications of optical fibres?                          | [3] |
| g)   | Define the terms unit cell and lattice parameters.                    | [2] |
| h)   | Calculate packing factor of BCC and FCC lattices.                     | [3] |
| i)   | State Bragg's law.  | [2] |
| j)   | What are point defects?   | [3] |

**PART-B**

(50 Marks)

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|------|---|-------|
| 2.a) | Describe interference in thin films by reflected light. |       |
| b)   | Explain single slit diffraction quantitatively.         | [5+5] |

**OR**

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|------|---|-------|
| 3.a) | Describe Newton's rings experiment to determine wave length of light. |       |
| b)   | Discuss the theory of N-slits diffraction.                            | [5+5] |

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|------|--|-------|
| 4.a) | Explain the theory of double refraction.             |       |
| b)   | Discuss the working principle of quarter wave plate. | [5+5] |

**OR**

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|------|--|-------|
| 5.a) | Describe the construction, principle and working of He-Ne laser. |       |
| b)   | What are the applications of lasers?                             | [5+5] |

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|------|---|-------|
| 6.a) | Derive the expression for numerical aperture and acceptance angle of a fibre. |       |
| b)   | What are the classification of attenuation in fibres?                         | [5+5] |

**OR**

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|------|--|-------|
| 7.a) | Distinguish between step index and graded index fibre. |       |
| b)   | Explain total internal reflection principle in fibres. | [5+5] |

- 8.a) What are miller indices? Explain the procedure to index a plane. [5+5]  
b) Calculate atomic radius in the case of BCC and FCC lattices. [5+5]

OR

- 9.a) Discuss the classification of crystal systems.  
b) Find the relation between inter planar spacing and lattice parameters in a cubic system. [5+5]

- 10.a) Discuss X-Ray diffraction Laue method to determine lattice parameters.  
b) Distinguish between Frankel and Schottky defects. [5+5]

OR

- 11.a) Describe powder method to determine lattice parameters of a crystal.  
b) Distinguish between interstitial and substitutional defects. [5+5]

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