**Hall Ticket Number: 20EC507**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Electronics and Communications Engineering** | | |
| **Fifth Semester** | **Optical Communications** | | |
| **Time:** Three Hours | | **Maximum:**70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M | |
| 1 | a) | Define acceptance angle | CO 1 | L1 | 1M | |
|  | b) | What are meridional rays? | CO 1 | L1 | 1M | |
|  | c) | Write an expression for numerical aperture of skew rays | CO 1 | L1 | 1M | |
|  | d) | Define critical angle of incidence. | CO 1 | L1 | 1M | |
|  | e) | Define refractive index profile | CO 2 | L1 | 1M | |
|  | f) | Among the different fibres, which has the highest dispersion? | CO 2 | L4 | 1M | |
|  | g) | List different types of scattering losses | CO 2 | L1 | 1M | |
|  | h) | Define intramodal dispersion loss | CO 2 | L1 | 1M | |
|  | i) | Define internal quantum efficiency | CO 3 | L1 | 1M | |
|  | j) | Define responsivity of a photo detector | CO 3 | L1 | 1M | |
|  | k) | Give examples for direct band gap semi-conductor materials used to manufacture LED | CO 3 | L1 | 1M | |
|  | l) | Define OTDM | CO 4 | L1 | 1M | |
|  | m) | Define multiplexing | CO 4 | L1 | 1M | |
|  | n) | What is the use of AGC | CO 4 | L1 | 1M | |
| **Unit-I** | | | | | | |
| 2 | a) | Derive an expression for numerical aperture of an optical fiber considering meridional rays. | CO 1 | L3 | 7M | |
|  | b) | Write a short notes on fiber materials | CO 1 | L1 | 7M | |
| **(OR)** | | | | | | |
| 3 | a) | Compare single mode and multimode fibers | CO 1 | L4 | 7M | |
|  | b) | Discuss step index fiber with a neat diagram. | CO 1 | L2 | 7M | |
| **Unit-II** | | | | | | |
| 4 | a) | Discuss different absorption loss mechanisms in SiO2 optical fiber | CO 2 | L2 | 7M | |
|  | b) | Derive an expression for group delay τmat resulting from material dispersion. | CO 2 | L3 | 7M | |
| **(OR)** | | | | | | |
| 5 | a) | Write a short notes on i. Bending losses ii.Fibre connectors | CO 2 | L2 | 7M | |
|  | b) | Explain any two linear scattering losses | CO 2 | L2 | 7M | |
| **Unit-III** | | | | | | |
| 6 | a) | Describe the construction and working of double hetro- junction surface emitting and edge emitting LED. | CO 3 | L2 | 7M | |
|  | b) | Explain the operation of PIN photo detector | CO 3 | L2 | 7M | |
| **(OR)** | | | | | | |
| 7 | a) | Write a short notes on DFB, DBR Lasers. | CO 3 | L2 | 7M | |
|  | b) | Compare surface emitting and edge emitting LEDs | CO 3 | L4 | 7M | |
| **Unit-IV** | | | | | | |
| 8 | a) | Discuss the point to point fiber optic link and its characteristics | CO 4 | L2 | 7M | |
|  | b) | Write a short note on pre- amplifiers and AGC | CO 4 | L1 | 7M | |
| **(OR)** | | | | | | |
| 9 | a) | Define intensity modulation and explain working of LED drive circuit with neat sketch | CO 4 | L2 | | 7M |
|  | b) | Explain fault detection using OTDR | CO 4 | L2 | | 7M |

