**18EC703**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Electronics & Communication Engineering** | | |
| **Seventh Semester** | **Fiber Optics & Communications** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | Define the term ‘Critical Angle’. | CO1(BL1) | |  |
|  | b) | Define mode –field diameter. | CO1(BL1) | |  |
|  | c) | List the types of dispersion. | CO2(BL1) | |  |
|  | d) | What is ‘Fusion splicing’? | CO2(BL1) | |  |
|  | e) | What are the techniques used in splicing? | CO2(BL1) | |  |
|  | f) | Define Population Inversion | CO3(BL1) | |  |
|  | g) | Write about ‘Sensitivity’ of a photo detector. | CO3(BL1) | |  |
|  | h) | Name different materials used for LED fabrication. | CO3(BL1) | |  |
|  | i) | What are the Source limitations in Optical Transmitter Circuit? | CO4(BL1) | |  |
|  | j) | Define OTDR. | CO4(BL1) | |  |
| **Unit - I** | | | | | |
| 2. | a) | Explain in detail about the elements of fiber optic communication system. | CO1(BL3) | **5M** | |
|  | b) | Describe in detail about different modes in Cylindrical fibers. | CO1(BL2) | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Compute the V-number and number of modes supported by a fiber with n1=1.68, n2=1.62 and core radius 35 μm and operating wavelength is 1500 nm for a Step index fibers. | CO1(BL3) | **5M** | |
|  | b) | State ray theory behind the optical fiber communication with a special mention about the total internal reflection, Acceptance angle and Numerical aperture. | CO1(BL1) | **5M** | |
| **Unit - II** | | | | | |
| 4. | a) | Explain about the dispersion in Single mode fibers. | CO2(BL4) | **5M** | |
|  | b) | Discuss about nonlinear scattering losses in Optical fiber. | CO2(BL2) | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Describe the mechanism of intermodal dispersion in a multimode step index fiber. | CO2(BL2) | **5M** | |
|  | b) | What are macro bending losses and micro bending losses? Explain with suitable diagrams | CO2(BL1) | **5M** | |

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| **Unit - III** | | | | |
| 6. | a) | Explain the working principle of Semi-Conductor Injection Laser with neat diagram. | CO3(BL4) | **5M** |
|  | b) | Illustrate in detail about Double-hetero junction LED. | CO3(BL3) | **5M** |
|  |  | **(OR)** |  |  |
| 7. | a) | Sketch the diagram of p-i-n photodiode and discuss its operation. | CO3(BL3) | **5M** |
|  | b) | Determine the quantum efficiency and responsivity of a PIN photodiode operating at 850 nm wavelength if 6.2 × 1012 photons incident at 850 nm generate 1.2 ×1012 electrons from the device. | CO3(BL3) | **5M** |
| **Unit - IV** | | | | |
| 8. | a) | Explain with the help of a suitable block diagram the function of every element of a fiber optic receiver | CO4(BL4) | **5M** |
|  | b) | Compare the advantages and disadvantages of using WDM in optical fiber communication system. | CO4(BL4) | **5M** |
|  |  | **(OR)** |  |  |
| 9. | a) | Discuss the Four-channel OTDM fiber system and list its applications. | CO4(BL2) | **5M** |
|  | b) | Write a short note on i) LED drive circuit ii) The preamplifier and AGC. | CO4(BL1) | **5M** |

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