Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14EC2048** | **Duration :** | **3hrs** |
| **Sub. Name :** | **FIBER OPTIC COMMUNICATION** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Draw the structures of single and multimode step index fibers and graded index fiber with their typical dimensions. | CO1 | 20 |
| (OR) | | | | |
| 2. |  | Derive an expression for numerical aperture of a step index fiber. | CO1 | 20 |
|  |  |  |  |  |
| 3. |  | Explain with suitable diagrams the different mechanisms that contribute to attenuation in optical fibers. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | A 6 km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive index of 1%. Estimate the delay difference between the slowest and fastest modes at the fiber output and the rms pulse broadening due to intermodal dispersion on the link. Also derive the expression involved in it. | CO2 | 20 |
|  |  |  |  |  |
| 5. |  | Discuss the principle of operation of LASER diodes. What are the effects of temperature on the performance of a LASER diode? | CO2 | 20 |
| (OR) | | | | |
| 6. |  | A silicon p-i-n photodiode incorporated into an optical receiver has a quantum efficiency of 60% when operating at a wavelength of 0.9mm. The dark current is 3 nA and the load resistance is 4 kΩ. The incident optical power is 200 nW and the post detection bandwidth of the receiver is 5 MHz. Calculate the root mean square (rms) shot noise and thermal noise currents generated. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Discuss the sources of errors in optical receivers. | CO3 | 20 |
| (OR) | | | | |
| 8. |  | With the neat sketch explain the operation of PIN photodiode and Avalanche photodiode. | CO3 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain the salient features of solitons using relevant expressions and diagrams. | CO3 | 20 |