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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April / May – 2017**

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| **Code :** | **14EC2022** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MICROWAVE AND OPTICAL COMMUNICATION** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | Marks |
| 1. | a. | Explain the operation of directional coupler and derive its scattering matrix. | CO1 | 15 |
| b. | Write short notes on waveguide bend. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Derive the S matrix for E plane tee. | CO1 | 15 |
| b. | Write short notes on choke flanges. | CO1 | 5 |
| 3. |  | Explain the operation of two cavity klystron with functional diagram and applegate diagram. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | With neat diagram, describe the operation of wide band microwave amplifier having high gain and low noise. | CO3 | 20 |
| 5. |  | Explain the operation of Transferred Electron Device (TED) with necessary diagrams. | CO3 | 20 |
| (OR) | | | | |
| 6. |  | Elucidate the operating principle of Read diode with neat physical structure diagram and waveforms. | CO3 | 20 |
| 7. | a. | With a neat block diagram, explain the fundamental elements of optical fiber communication. | CO2 | 15 |
|  | b. | What are the advantages of optical communication over electrical communication? | CO2 | 5 |
| (OR) | | | | |
| 8. | a. | Describe the classification of optical fiber cables based on modes of transmission and refractive index profile with neat diagrams. | CO2 | 15 |
|  | b. | Calculate the numerical aperture and acceptance angle for an optical fiber of which the refractive index of core is 1.5 and refractive index of cladding is 1.48. | CO2 | 5 |
|  | | **Compulsory:** |  |  |
| 9. | a. | What are the three basic processes in laser? Explain with two level energy diagram. | CO3 | 3 |
|  | b. | The ratio of population of two energy levels is 1.059 x 10-30. Find the wavelength of the light emitted from it at 300 K. | CO3 | 3 |
|  | c. | Why do we need photodetectors in the optical communication system? | CO3 | 4 |
|  | d. | Explain in detail about the Surface Emitting LED and Edge Emitting LED. | CO3 | 10 |