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 – Nov/Dec – 2016**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EC2046** | **Duration :** | **3hrs** |
| **Sub. Name :** | **OPTO ELECTRONICS** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Give the relationship between electric and magnetic field in optical wave equation. | CO1 | 15 |
| b. | Sketch the wave packets for combination of two progressive waves in equal frequency and discuss the same based on group velocity | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Calculate the Brewster angle of or glass given that its reractive index in air is 1.5? Assume glass interace with air n=1. | CO1 | 5 |
| b. | Discuss the wave nature of light and describe polarization, interference and  diffraction with suitable example. | CO1 | 15 |
| 3. | a. | Draw the structure of LED and explain its working principle of an electrolumniscence in detail. | CO2 | 15 |
|  | b. | With the help of schematic diagram of the variation in the energy levels of an impurity ion explain the photoluminescence process. | CO2 | 5 |
| (OR) | | | | |
| 4. | a. | Obtain the expression for threshold condition for amplification in Laser cavity. | CO1 | 10 |
|  | b. | Discuss the theory of mode locking in Laser and explain about active and passive mode locking. | CO1 | 10 |
| 5. | a. | Draw the wheatstone bridge circuit and explian the bolometer operation based on α temperature coefficent of resistance. | CO2 | 10 |
|  | b. | State the importance of pneumatic detectros and discuss the radiation power  measurment using Golay cell detectors. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Obtain the expression of photo conductive gain for a slab of photoconductive material | CO2 | 10 |
|  | b. | Draw the equivalent circuit diagram of a photodiode with different modes and derive the external voltage equation. | CO2 | 10 |
| 7. | a. | Elaborate the operation of magneto optic devices and discuss its merits in detail. | CO2 | 10 |
|  | b. | Give the different types of modulation techniques and its importance in  optical communication? | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss about the Birefringence and the Electro optic effect with application to phase modulation with necessary equations and diagram | CO3 | 15 |
|  | b. | Draw the schematic illustration of acousto-optic modulation and explain the process of wave propagation ? | CO3 | 5 |
|  | | **Compulsory** |  |  |
| 9. | a. | Describe the importance of optoelectronic integrated circuits in real time applications with examples. | CO3 | 15 |
|  | b. | Draw the schematic of guided wave Mach-Zehnder interferometer with couplers and explain the operation. | CO3 | 5 |