******SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

**RAMAPURAM CAMPUS**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**CONTINUOUS LEARNING ASSESMENT – II**

Sub Code/Name : **18ECO107T FIBEROPTICS & OPTOELECTRONICS** Set: **B**

Class/Sem/Course : **III Yr / VI Sem / B. Tech -CSE (ALL DISCIPLINE) & IT** Date :  **.2023**

Max Marks : **50** Duration: **90 mins**

**PART-A (10x1= 10)**

**ANSWER ALL THE QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 1 | In waveguide dispersion, refractive index is independent of  a) Bit rate b) Index difference c) Velocity of medium d) Wavelength | 1 | 2 | 2 | 1.2.1 |
| 2 | Disturbance along the fiber such as vibrations, discontinuities, connectors, splices, source/detectors coupling result in a) Modal noise b) Inter-symbol interference c) Infrared interference d) Pulse broadening | 1 | 2 | 1 | 1.3.1 |
| 3 | Effects of intrinsic absorption can be minimized by  a) Ionization b) Radiation  c) Suitable choice of core and d) Melting  cladding components | 1 | 2 | 2 | 2.1.2 |
| 4 | In the single mode fibers, the dominant dispersion mechanism is  a) Intermodal dispersion b) Intra-modal dispersion  c) Material dispersion d) Frequency distribution | 1 | 2 | 1 | 1.3.1 |
| 5 | Select the wavelength of the optical spectrum that produces maximum attenuation  a) 850nm b) 900nm c)1400nm d)1300nm | 1 | 2 | 1 | 1.3.1 |
| 6 | Identify the device which converts electrical energy in the form of a current into optical energy.  a) Optical source b) Optical coupler  c) Optical isolator d) Circulator | 1 | 3 | 1 | 1.2.1 |
| 7 | The ratio of electron-hole pairs generated to the incident photons is  a)Power efficiency b) Quantum efficiency  c)Signal efficiency d)Carrier efficiency | 1 | 3 | 3 | 2.1.2 |
| 8 | Amount of radiance in planer type of LED structures is  a) Low b) High  c) Zero d) Negligible | 1 | 3 | 1 | 1.3.1 |
| 9 | In semiconductor injection laser, narrow line bandwidth is of the order.  a) 5 nm b) 1 nm or less  c) 4 nm d) 3 nm | 1 | 3 | 1 | 1.3.1 |
| 10 | The newly generated carriers accelerated by high electric field gaining enough energy to cause ionization known as  a) Spontaneous rupture b) Narrow band effect  c) Avalanche effect d) LED Efffect | 1 | 3 | 3 | 1.2.1 |

**PART B (4x4= 16)**

**ANSWER ANY 4 QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 11. | Compare intra and inter modal dispersion. | 4 | 2 | 1 | 1.2.1 |
| 12 | Give the principle of photo detection in semiconductor. | 4 | 2 | 2 | 1.2.1 |
| 13 | What is the maximum core radius allowed for a glass fiber having n1=1.465 and n2=1.46 if the fiber is to support only one mode at wavelength of 1250nm. | 4 | 2 | 1 | 2.1.3 |
| 14 | Define Quantum efficiency? | 4 | 3 | 2 | 1.2.1 |
| 15 | List the factors that cause Rayleigh scattering in optical fibers. | 4 | 3 | 1 | 2.1.2 |
| 16 | Compare fluorescence and phosphorescence | 4 | 3 | 1 | 1.2.1 |

**PART C (2x12= 24)**

**ANSWER THE QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 17. a | Illustrate micro bending and macro bending losses with suitable diagram.  (OR)  Explain the scattering and bending losses that occur in an optical fiber with relevant diagrams and expressions. | 12 | 2 | 3 | 2.1.3 |
| 17. b | 12 | 2 | 2 | 2.1.3 |
| 18. a | Discuss the construction and working of Surface emitting LED also list its advantages.  (OR)  Sketch the structure of LASER and explain its working principle. | 12 | 3 | 2 | 2.1.3 |
| 18. b | 12 | 3 | 3 | 2.1.2 |

**Outcome Alignment Matrix:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **QUESTION**  **NUMBER** | **CO distribution** | | | | |
| **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| 1 |  | 1 |  |  |  |
| 2 |  | 1 |  |  |  |
| 3 |  | 1 |  |  |  |
| 4 |  | 1 |  |  |  |
| 5 |  | 1 |  |  |  |
| 6 |  |  | 1 |  |  |
| 7 |  |  | 1 |  |  |
| 8 |  |  | 1 |  |  |
| 9 |  |  | 1 |  |  |
| 10 |  |  | 1 |  |  |
| 11 |  | 1 |  |  |  |
| 12 |  |  | 1 |  |  |
| 13 |  | 1 |  |  |  |
| 14 |  |  | 1 |  |  |
| 15 |  | 1 |  |  |  |
| 16 |  |  | 1 |  |  |
| 17a |  | 1 |  |  |  |
| 17b |  | 1 |  |  |  |
| 18a |  |  | 1 |  |  |
| 18b |  |  | 1 |  |  |
| **Total** |  | **41** | **41** |  |  |
| **%** |  | **50%** | **50%** |  |  |

**Quality Matrix**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Question No.** | **BL Distribution** | | |
| **L1** | **L2** | **L3** |
| 1 |  | 1 |  |
| 2 | 1 |  |  |
| 3 |  | 1 |  |
| 4 | 1 |  |  |
| 5 | 1 |  |  |
| 6 | 1 |  |  |
| 7 |  |  | 1 |
| 8 | 1 |  |  |
| 9 | 1 |  |  |
| 10 |  |  | 1 |
| 11 | 4 |  |  |
| 12 |  | 4 |  |
| 13 | 4 |  |  |
| 14 |  | 4 |  |
| 15 | 4 |  |  |
| 16 | 4 |  |  |
| 17a |  |  | 12 |
| 17b |  | 12 |  |
| 18a |  |  | 12 |
| 18b |  | 12 |  |
| **Total** | **22** | **34** | **26** |
| **%** | **27%** | **41%** | **32%** |

**Bloom’s level Distribution:**

Prepared by: Mr. Mahesh Kumar N Scrutinised by: Mrs V. Reji

Verified and approved by HOD