**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

**RAMAPURAM CAMPUS**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**CONTINUOUS LEARNING ASSESSMENT–III**

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

Class/Sem/Course : **IIIYr / VISem / B. Tech -CSE (ALL DISCIPLINE) & IT** Date :  **6/5/2023**

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

**PART-A ( 10 x 1 = 10)**

**ANSWER ALL THE QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 1 | **The change in the refractive index of a medium due to the presence of sound waves is called**  a) acousto optic effect b) coulomb blockade effect  c) photo emissive effect d) electro optic effect | 1 | 4 | 2 | 1.3.1 |
| 2 | Induced birefringence is called  a) magneto optic effect b) electro optic effect  c) acousto optic effect d) thermal optic effect | 1 | 4 | 1 | 1.3.1 |
| 3 | The material used for constructing the active region of the photo conductor is  a) silicon b) germanium  c) carbon d) InGaAs | 1 | 4 | 2 | 1.3.1 |
| 4 | In a Raman-Nath modulator, the acousto-optic grating is  a) so thin that it behaves almost like a plane transmission grating  b)so thick that it behaves almost like Bragg’s crystal grating  c)analogous to a concave Rowland’s grating  d) quite complicated | 1 | 4 | 1 | 1.3.1 |
| 5 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cannot be used for wideband amplification.  a) Semiconductor optical amplifier  b) Erbium-doped fiber amplifier  c) Raman fiber amplifier  d) Brillouin fiber amplifier | 1 | 4 | 1 | 1.3.1 |
| 6 | Circuits fabricated from GaAs or AlGaAs operate in wavelength region of \_\_\_\_\_\_\_\_\_\_ a) 0.1 and 0.2 μm b) 0.8 and 0.9 μm c) 0.4 and 0.6 μm d) 0.6 and 0.7 μm | 1 | 5 | 1 | 1.3.1 |
| 7 | Monolithic integration can be achieved in either  a) Vertical or horizontal configuration  b) Vertical configuration  c) horizontal configuration  d) Vertical and horizontal configuration | 1 | 5 | 3 | 2.1.3 |
| 8 | Which category/ies of wavelength division multiplexer comprise/s two 3dB couplers where the splitting of an incident beam takes place into two fiber paths, followed by the recombination with second 3-dB coupler?  a) Interference filter based devices  b) Angular dispersion based devices  c) Mach-Zehnder Interferometers  d) Passive waveguide | 1 | 5 | 1 | 1.3.1 |
| 9 | HEMT based \_\_\_\_\_\_\_\_\_\_ have a spot-size convertor with a photodiode.  a) p-n junction diode b) p-i-n photoreceiver  c) IGBT d) BJT | 1 | 5 | 1 | 1.3.1 |
| 10 | Optical fiber couplers are also called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a) Isolators b) Circulators  c) Directional couplers d) Attenuators | 1 | 5 | 3 | 2.1.3 |

**PART-B ( 4 x 4 = 16)**

**ANSWER ANY FOUR QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 11. | Demonstrate the principle of a photonic switch based on self electro optic Device (SEED) | 4 | 4 | 1 | 1.2.1 |
| 12. | Explain about Electro-optic Modulators | 4 | 4 | 2 | 1.2.1 |
| 13. | Differentiate monolithic and hybrid integration of OEIC fabrication | 4 | 5 | 1 | 1.2.1 |
| 14. | Discuss about the materials and processing of OEICs | 4 | 5 | 2 | 1.2.1 |
| 15. | Comment on Active couplers. | 4 | 5 | 1 | 1.2.1 |
| 16. | List out the advantages of Erbium Doped Fiber Amplifiers. | 4 | 4 | 1 | 2.1.2 |

**PART - C ( 2 x 12 = 24)**

**ANSWER ALL THE QUESTIONS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | **Question** | **Marks** | **CO** | **BL** | **PI** |
| 17a. | Explain in detail about Raman Nath and Bragg modulator  (or)  Discuss the basic configuration and gain of Semiconductor optical amplifier (SOA) | 12 | 4 | 2 | 2.1.3 |
| 17b. | 12 | 4 | 2 | 2.1.3 |
| 18a. | Illustrate the operation of a PIN diode integrated HBT photo receiver with a neat diagram  (or)  With a neat sketch, write about the guided wave Mach-Zehnder interferometer | 12 | 5 | 3 | 2.1.3 |
| 18b. | 12 | 5 | 2 | 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 |  |  |  | 4 |  |
| 12 |  |  |  | 4 |  |
| 13 |  |  |  | 4 |  |
| 14 |  |  |  |  | 4 |
| 15 |  |  |  |  | 4 |
| 16 |  |  |  |  | 4 |
| 17a |  |  |  | 12 |  |
| 17b |  |  |  | 12 |  |
| 18a |  |  |  |  | 12 |
| 18b |  |  |  |  | 12 |
| **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** | **23** | **34** | **25** |
| **%** | **27%** | **41%** | **32%** |

**Bloom’s level Distribution:**

Prepared by: Dr.M.VidhyaLakshmi

Assistant Professor/ECE Scrutinised by: Mrs V. Reji

Verified and approved by HOD