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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Fifth Semester)

BEIPE 5041- OPTOELECTRONIC DEVICES AND INSTRUMENTATION

(AE & IE)

Time: 2 hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.**PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

[CO#] [PO#]

- | | | |
|---|---|---|
| a. Multimode step index fiber has _____ | 1 | 2 |
| (i) Large core diameter & large numerical aperture | (ii) Large core diameter and small numerical aperture | |
| (iii) Small core diameter and large numerical aperture | (iv) Small core diameter & small numerical aperture | |
| b. How many mechanisms are there which causes absorption? | 1 | 2 |
| (i) One | (ii) Two | |
| (iii) Three | (iv) Four | |
| c. A device which converts electrical energy in the form of a current into optical energy is called as ____ | 2 | 1 |
| (i) Optical source | (ii) Optical coupler | |
| (iii) Optical isolator | (iv) Circulator | |
| d. In photo detectors, energy of incident photons must be _____ band gap energy. | 2 | 2 |
| (i) Lesser than | (ii) Greater than | |
| (iii) Same as | (iv) Negligible | |
| e. The more advantages optical amplifier is _____ | 3 | 1 |
| (i) Fiber amplifier | (ii) Semiconductor amplifier | |
| (iii) Repeaters | (iv) Mode hopping amplifier | |
| f. For used in single-mode fiber _____ are used preferably. | 3 | 1 |
| (i) Semiconductor optical amplifier | (ii) Erbium-doped fiber amplifier | |
| (iii) Raman fiber amplifier | (iv) Brillouin fiber amplifier | |
| g. _____ imposes serious limitations on the system performance. | 4 | 2 |
| (i) Fiber attenuation | (ii) Fiber modulation | |
| (iii) Fiber demodulation | (iv) Fiber dispersion | |
| h. OTDR stands for ____ | 4 | 2 |
| (i) Optical time domain reflectometer | (ii) Optical transfer data rate | |
| (iii) Optical time data registers | (iv) None of the mentioned | |
| i. Under normal condition, a single fiber should not be used for a two-way | 1 | 3 |

communication mainly because of

- | | | | |
|--|------------------|---|---|
| (i) Loss | (ii) Fading | | |
| (iii) Noise | (iv) Attenuation | | |
| j. A step-index multimode optical fiber has a core diameter of _____ nm. | | 1 | 3 |
| (i) 0.02 | (ii) 0.2 | | |
| (iii) 2 | (iv) 0.002 | | |

PART – B: (Short Answer Questions)

(2 x 5 = 10 Marks)

Q.2. Answer ALL questions

	[CO#]	[PO#]
a. List the advantages of optical communication.	1	2
b. Discusses the disadvantages of Laser Diode.	2	2
c. Define Scattering in optical fibers	3	2
d. Briefly explain about Isolator.	4	2
e. Explain about stimulated and spontaneous emission.	1	3

PART – C: (Long Answer Questions)

(6 x 5 = 30 Marks)

Answer ANY FIVE questions

	Marks	[CO#]	[PO#]
3. Explain the following: (i). Total Internal Reflection (ii). Numerical Aperture	(6)	1	2
4. With neat diagram discuss about attenuation and absorption in fiber optics.	(6)	1	3
5. Draw the structure of LED and explain with types.	(6)	2	1
6. With neat sketch explain the working principal PIN photodiode.	(6)	2	2
7. With help of diagram elaborate the working nature of erbium doped fiber amplifier.	(6)	3	1
8. Explain in detail about optical fiber circulators.	(6)	3	2
9. Explain in detail about OFDR	(6)	4	2
10. Derive expression for material dispersion.	(6)	4	2

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