

Code No: RR410404

RR

Set No. 2

IV B.Tech I Semester Examinations, November 2010

OPTICAL COMMUNICATIONS

Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is splicing? Explain about fusion splicing? [10]
(b) An optical fiber has a core refractive index of 1.5. Two lengths of the fiber with smooth and perpendicular to the core axes end faces are butted together. Assuming the fiber axes are perfectly aligned, calculate the optical loss in decibels at the joint (due to Fresnel reflection) when there is a small air gap between the fiber end faces. [6]
2. (a) List out the advantages and disadvantages of optical fiber communication. [8]
(b) Discuss the Analog and Digital Applications of Optical fiber. [8]
3. (a) Define the quantum efficiency and the responsivity of a photo detector. Derive an expression for the responsivity of an intrinsic photo detector in terms of the quantum efficiency of the device and the wavelength of the incident radiation. [10]
(b) Determine the wavelength at which the quantum efficiency and the responsivity are equal. [6]
4. (a) Describe with diagram to explain the operation of a unidirectional WDM system.
(b) Discuss about a bidirectional WDM system. [8+8]
5. (a) What are pre amplifiers? Describe the different types of pre amplifier with suitable circuit. [8]
(b) Derive an expression for receiver sensitivity. [8]
6. (a) Explain the bending losses in the optical fiber.
(b) What is micro bending and how can it be reduced?
(c) Explain with diagram how the microbending is minimized and avoided by a compressible jacket. [8+5+3]
7. (a) With the help of schematic diagram and relevant expressions explain any one structure of LED. [8]
(b) A practical surface emitting LED has a $25\mu\text{m}$ diameter emitting area and operates at a peak modulation current of 50mA. What is the bandwidth of a GaAlAs LED having a 1.5mm active area thickness? Take $B_r = 10^{-10}\text{cm}^3/\text{s}$ and $S = 10^4\text{cm/s}$. [8]

Code No: RR410404

RR

Set No. 2

8. Write short notes on

- (a) Halide glass fibers
- (b) Chalcogenide glass fibers

[8+8]

FIRSTRANKER

Code No: RR410404

RR

Set No. 4

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OPTICAL COMMUNICATIONS

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Time: 3 hours

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(b) Discuss the Analog and Digital Applications of Optical fiber. [8]
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(b) Determine the wavelength at which the quantum efficiency and the responsivity are equal. [6]
3. (a) What is splicing? Explain about fusion splicing? [10]
(b) An optical fiber has a core refractive index of 1.5. Two lengths of the fiber with smooth and perpendicular to the core axes end faces area butted together. Assuming the fiber axes are perfectly aligned, calculate the optical loss in decibels at the joint (due to Fresnel reflection) when there is a small air gap between the fiber end faces. [6]
4. Write short notes on
(a) Halide glass fibers
(b) Chalcogenide glass fibers [8+8]
5. (a) What are pre amplifiers? Describe the different types of pre amplifier with suitable circuit. [8]
(b) Derive an expression for receiver sensitivity. [8]
6. (a) With the help of schematic diagram and relevant expressions explain any one structure of LED. [8]
(b) A practical surface emitting LED has a $25\mu\text{m}$ diameter emitting area and operates at a peak modulation current of 50mA. What is the bandwidth of a GaAlAs LED having a 1.5mm active area thickness? Take $B_r = 10^{-10}\text{cm}^3/\text{s}$ and $S = 10^4\text{ cm/s}$. [8]
7. (a) Explain the bending losses in the optical fiber.
(b) What is micro bending and how can it be reduced?

Code No: RR410404

RR

Set No. 4

- (c) Explain with diagram how the microbending is minimized and avoided by a compressible jacket. [8+5+3]
8. (a) Describe with diagram to explain the operation of a unidirectional WDM system.
- (b) Discuss about a bidirectional WDM system. [8+8]

FIRSTRANKER

Code No: RR410404

RR

Set No. 1

IV B.Tech I Semester Examinations, November 2010

OPTICAL COMMUNICATIONS

Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours

Max Marks: 80

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All Questions carry equal marks

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(b) What is micro bending and how can it be reduced?
(c) Explain with diagram how the microbending is minimized and avoided by a compressible jacket. [8+5+3]
2. (a) Describe with diagram to explain the operation of a unidirectional WDM system.
(b) Discuss about a bidirectional WDM system. [8+8]
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Code No: RR410404

RR

Set No. 1

- (b) Derive an expression for receiver sensitivity. [8]
8. (a) List out the advantages and disadvantages of optical fiber communication. [8]
- (b) Discuss the Analog and Digital Applications of Optical fiber. [8]

FIRSTRANKER

Code No: RR410404

RR

Set No. 3

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Answer any FIVE Questions
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(b) Derive an expression for receiver sensitivity. [8]
2. (a) Describe with diagram to explain the operation of a unidirectional WDM system.
(b) Discuss about a bidirectional WDM system. [8+8]
3. (a) Define the quantum efficiency and the responsivity of a photo detector. Derive an expression for the responsivity of an intrinsic photo detector in terms of the quantum efficiency of the device and the wavelength of the incident radiation. [10]
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Code No: RR410404

RR

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8. Write short notes on

(a) Halide glass fibers

(b) Chalcogenide glass fibers

[8+8]

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