

Code No: R05321002

R05**Set No. 2**

III B.Tech II Semester Examinations, December 2010

PRINCIPLES OF COMMUNICATION**Common to Instrumentation And Control Engineering, Electronics And Instrumentation Engineering****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Prove the following identities:
 - i. $I(x, y) = H(y) - H(y, x)$ bits/message.
 - ii. $I(x, y) = H(x) + H(y) - H(x, y)$ bits/message.
- (b) Define terms redundancy, efficiency and channel capacity and prove that Redundancy = 1 - efficiency. [8+8]
2. (a) How are fiber - optic sensors classified?
- (b) Suggest a criterion for designing an intensity modulated fiber optical sensor. Explain the factors on which the signals developed by the detector depend on. [8+8]
3. (a) Discuss the mechanism of optical feedback to provide oscillation and hence amplification within the laser.
- (b) Discuss how a distinctive spectral output is produced from the laser device. [8+8]
4. (a) Explain the working of Adaptive delta modulation system with neat block diagram.
- (b) Clearly bring out the difference between granular noise and slope over load error. [8+8]
5. (a) Explain the Phenomenon of Fresnel reflection associated with the step changes in refractive index at the jointed interface.
- (b) A Multimode step index fiber with a core refractive index of 1.52 is fusion spliced. The splice exhibits an insertion loss of 0.8 dB. This insertion loss is found to be entirely due to angular misalignment of fiber core axes which is 7° . Determine numerical aperture of the fiber. [8+8]
6. (a) From the ray theoretical consideration, derive
 - i. The light guidance condition.
 - ii. An expression for multipath pulse dispersion.
- (b) Explain how the modal dispersion is reduced by use of graded index fibers. [8+8]
7. Write notes on the following:

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- (a) Holographic interferometers
 - (b) Holograms on magnetic tape. [8+8]
8. (a) Discuss about lens coupling of LED's to optical fibers and outline the various techniques employed.
- (b) Derive an expression for the internal optical power of a planar LED fabricated from gallium arsenide. [8+8]

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R05**Set No. 4****III B.Tech II Semester Examinations, December 2010****PRINCIPLES OF COMMUNICATION****Common to Instrumentation And Control Engineering, Electronics And
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All Questions carry equal marks**

1. (a) Discuss about lens coupling of LED's to optical fibers and outline the various techniques employed.
- (b) Derive an expression for the internal optical power of a planar LED fabricated from gallium arsenide. [8+8]
2. (a) Explain the working of Adaptive delta modulation system with neat block diagram.
- (b) Clearly bring out the difference between granular noise and slope over load error. [8+8]
3. (a) Discuss the mechanism of optical feedback to provide oscillation and hence amplification within the laser.
- (b) Discuss how a distinctive spectral output is produced from the laser device. [8+8]
4. (a) From the ray theoretical consideration, derive
 - i. The light guidance condition.
 - ii. An expression for multipath pulse dispersion.
- (b) Explain how the modal dispersion is reduced by use of graded index fibers. [8+8]
5. Write notes on the following:
 - (a) Holographic interferometers
 - (b) Holograms on magnetic tape. [8+8]
6. (a) Prove the following identities:
 - i. $I(x, y) = H(y) - H(y, x)$ bits/message.
 - ii. $I(x, y) = H(x) + H(y) - H(x, y)$ bits/message.
- (b) Define terms redundancy, efficiency and channel capacity and prove that Redundancy = 1 - efficiency. [8+8]
7. (a) How are fiber - optic sensors classified?
- (b) Suggest a criterion for designing an intensity modulated fiber optical sensor. Explain the factors on which the signals developed by the detector depend on. [8+8]

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8. (a) Explain the Phenomenon of Fresnel reflection associated with the step changes in refractive index at the jointed interface.
- (b) A Multimode step index fiber with a core refractive index of 1.52 is fusion spliced. The splice exhibits an insertion loss of 0.8 dB. This insertion loss is found to be entirely due to angular misalignment of fiber core axes which is 7° . Determine numerical aperture of the fiber. [8+8]

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R05**Set No. 1**

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- (b) A Multimode step index fiber with a core refractive index of 1.52 is fusion spliced. The splice exhibits an insertion loss of 0.8 dB. This insertion loss is found to be entirely due to angular misalignment of fiber core axes which is 7° . Determine numerical aperture of the fiber. [8+8]
2. (a) Prove the following identities:
 - i. $I(x, y) = H(y) - H(y, x)$ bits/message.
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- (b) Define terms redundancy, efficiency and channel capacity and prove that Redundancy = 1 - efficiency. [8+8]
3. Write notes on the following:
 - (a) Holographic interferometers
 - (b) Holograms on magnetic tape. [8+8]
4. (a) Discuss the mechanism of optical feedback to provide oscillation and hence amplification within the laser.
- (b) Discuss how a distinctive spectral output is produced from the laser device. [8+8]
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- (b) Suggest a criterion for designing an intensity modulated fiber optical sensor. Explain the factors on which the signals developed by the detector depend on. [8+8]
6. (a) Discuss about lens coupling of LED's to optical fibers and outline the various techniques employed.
- (b) Derive an expression for the internal optical power of a planar LED fabricated from gallium arsenide. [8+8]
7. (a) Explain the working of Adaptive delta modulation system with neat block diagram.

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- (b) Clearly bring out the difference between granular noise and slope over load error. [8+8]
8. (a) From the ray theoretical consideration, derive
- i. The light guidance condition.
 - ii. An expression for multipath pulse dispersion.
- (b) Explain how the modal dispersion is reduced by use of graded index fibers. [8+8]

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R05**Set No. 3**

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PRINCIPLES OF COMMUNICATION**Common to Instrumentation And Control Engineering, Electronics And
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 - i. $I(x, y) = H(y) - H(y, x)$ bits/message.
 - ii. $I(x, y) = H(x) + H(y) - H(x, y)$ bits/message.
- (b) Define terms redundancy, efficiency and channel capacity and prove that Redundancy = 1 - efficiency. [8+8]
2. (a) Discuss about lens coupling of LED's to optical fibers and outline the various techniques employed.
- (b) Derive an expression for the internal optical power of a planar LED fabricated from gallium arsenide. [8+8]
3. Write notes on the following:
 - (a) Holographic interferometers
 - (b) Holograms on magnetic tape. [8+8]
4. (a) From the ray theoretical consideration, derive
 - i. The light guidance condition.
 - ii. An expression for multipath pulse dispersion.
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6. (a) Explain the Phenomenon of Fresnel reflection associated with the step changes in refractive index at the jointed interface.
- (b) A Multimode step index fiber with a core refractive index of 1.52 is fusion spliced. The splice exhibits an insertion loss of 0.8 dB. This insertion loss is found to be entirely due to angular misalignment of fiber core axes which is 7° . Determine numerical aperture of the fiber. [8+8]
7. (a) Explain the working of Adaptive delta modulation system with neat block diagram.

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- (b) Clearly bring out the difference between granular noise and slope over load error. [8+8]
8. (a) Discuss the mechanism of optical feedback to provide oscillation and hence amplification within the laser.
- (b) Discuss how a distinctive spectral output is produced from the laser device. [8+8]

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