

B. Tech III Year I Semester Examinations, December-2011
COMMUNICATION THEORY
(INFORMATION TECHNOLOGY)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

1. a) Draw the phasor diagram of AM and NBFM and explain.
 b) Discuss the bandwidth consideration in FM. [10+6]
2. a) What is quantization error? Derive an expression for quantization error.
 b) State and prove the sampling theorem in time domain. [8+8]
3. a) Determine the entropy of binary memoryless source.
 b) A voice-grade channel of the telephone network has a bandwidth of 3.4 KHz
 i) Calculate the information capacity of the telephone channel for a signal-to-noise ratio of 30dB.
 ii) Calculate the minimum signal-to-noise ratio required to support information transmission through the telephone channel at the rate of 9.6 kbps. [8+8]
4. Write short notes on:
 a) Cross talk
 b) Convolutional codes
 c) Adaptive delta modulation. [16]
5. a) State and prove the following properties of the Fourier transform
 i) Time scaling ii) Frequency shifting
 b) The Fourier transform $X(f)$ of a signal $x(t)$ is defined by

$$X(f) = \begin{cases} 1, & f > 0 \\ \frac{1}{2}, & f = 0 \\ 0, & f < 0 \end{cases}$$
 Determine $x(t)$ [8+8]
6. a) Discuss any four properties of power spectral density.
 b) Explain Rayleigh probability density function. [8+8]
7. a) What is random variable?
 b) Explain discrete and continuous random variable.
 c) Distinguish between random variable and random processes. [4+4+6]
8. a) Derive a mathematical expressions for probability distribution function and probability density function.
 b) Compare SSB with VSB. [10+6]

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