

**II B.Tech II Semester Supplementary Examinations, April/May 2005**  
**COMMUNICATION THEORY**  
**(Information Technology)**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Define Fourier transform pair and prove the time-shift and frequency shift properties of Fourier transform.  
(b) If  $v(t) = \cos \omega_o t$ , find the amplitude spectral density.
2. (a) What is meant by autocorrelation. Explain with example.  
(b) Prove that the power spectral density and the correlation function of a periodic waveform are a Fourier transform pair.
3. (a) Explain with the block diagram the phase shift method of sideband suppression.  
(b) Derive an expression for the RMS value of output voltage of AM wave.
4. (a) Explain the principle of pre-emphasis and deemphasis with a circuit.  
(b) Compare and contrast various FM modulation methods.
5. (a) Define the terms: time division multiplexing and demultiplexing, synchronization and explain their importance in digital signalling.  
(b) What are the limitations of delta modulation and how they can be rectified in ADM.
6. (a) What is cross talk? Explain the reasons for cross talk in sampled signals and suggest methods to minimize cross talk.  
(b) Explain clearly ideal sampling and natural sampling and derive expression for the spectrum of naturally sampled signal with pulse width  $z$ .
7. (a) Define and explain the significance of the terms :
  - i. amount of Information
  - ii. Average information
  - iii. Entropy and information rate
  - iv. List out their units.  
(b) For a binary memoryless source, emitting symbols 0 and 1 with probabilities of  $p_0$  and  $p_1$  respectively, evaluate the entropy and sketch the entropy function. Explain the properties of the entropy function.
8. (a) Write short notes on parity check bit codes, and list out the different types of such codes.

(b) Write short notes on: Hamming Codes.

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