Code: R7221901

R07

B.Tech II Year II Semester (R07) Supplementary Examinations, April/May 2013

PRINCIPLES OF COMMUNICATIONS

(Electronics & Computer Engineering)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) What is Fourier transform? Give the significance of Fourier transform in the representation of signals.

(b) Find the Fourier transforms of the following:

(i) $\cos(w_0 t)$

(ii) rect (t).(rectangular function)

2 (a) Represent the amplitude modulation in the time domain and frequency domain with neat derivations.

(b) Give the comparison of AM, DSB SC, SSB SC.

3 (a) A carrier wave of frequency $100\ \text{MHz}$ is frequency modulated by a sinusoidal wave of amplitude 20 V and frequency $100\ \text{KHz}$. The frequency sensitivity of the modulator is $25\ \text{KHz/volt}$. Determine the approximated band width of FM signal using Carlson rule.

(b) Derive the relationship between the frequency and phase modulation.

4 (a) State and prove sampling theorem.

(b) Explain about the time division multiplexing (TDM) in detail with neat block diagram.

5 (a) Distinguish between uniform and non-uniform quantization.

(b) With a neat block diagram, explain the working of DPCM.

6 (a) Compare QAM and QPSK digital modulation schemes.

(b) Explain in detail the power spectra and bandwidth efficiency of m-ary FSK signals.

7 (a) Define the following terms:

(i) Entropy

(ii) Mutual information

(iii) Average information

(iv) Channel matrix

(b) Determine the entropy of a source emitting four symbols S_1, S_2, S_3 and S_4 with probabilities Y_2, Y_8, Y_4 and Y_8. Also determine the coding efficiency of the Huffman coding of the above symbols.

8 (a) Design a linear block code with minimum distance 3 and a message block of size 3-bits and find first four code words.

(b) What are convolution codes? Explain briefly.

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