J 1235

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Third Semester

Information Technology

IF 244 — PRINCIPLES OF COMMUNICATION

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define linear and nonlinear systems.

2. State central limit theorem.

3. Define AM and draw its spectrum.

4. What is meant by threshold effect?

5. Distinguish between natural sampling and flat top sampling.

6. Draw the PCM encoded wave form for the data stream 1110010 using NRZ format.

7. Compare the bandwidth and probability of error of m.ary FSK and M.ary PSK.

8. What is the principle of coherent detection of binary FSK signal?

9. Mention the processing gain of DS and FH spread spectrum techniques.

10. State the principle of linear block code.

PART B — (5 × 16 = 80 marks)

11. (i) The total power content of an AM signal is 500w. Determine the being transmitted at the carrier frequency and at each of the side when the percentage of modulation is 100.

(ii) Compare AM, FM and PM.

(iii) Explain the principle of FM ratio detector.

12. (a) (i) Determine the Fourier transform of the Rf pulse $f(t)$ give by

$$f(t) = \cos wt \quad \frac{-T}{2} < t < \frac{T}{2}$$

$= 0$ elsewhere.

(ii) Calculate the power spectral density of a stationary random pro for which the auto correlation is $R_{XX}(\tau) = \sigma^2 \ e^{-d(\tau)}$.

Or

(b) (i) A band limited filter has spectral density

$$X(f) = k, |f| < fe$$

0 otherwise

Calculate the autocorrelation function and the average power.

(ii) Explain the properties of cross correlation.

13. (a) (i) With a block diagram, explain base band BPAM system.

(ii) What is ISI? Explain. Discuss about the possible solutions of th ISI. (1

Or

(b) (i) Explain noise presence in PCM system. (

(ii) Derive the expression for output S/N ratio. (1

14. (a) (i) Obtain the power spectrum and the probability of bit error of FSI system with coherent reception. (10

(ii) Explain about minimum shift keying. (6

Or

(b) Discuss about the power spectrum and bandwidth efficiency of M–ary modulation scheme.

15. (a) (i) Describe in detail about the synchronization techniques employed in the receivers of both DS and FH spread spectrum systems. (12)

(ii) Compare the performance DS and FH spread spectrum system. (4)

Or

(b) The generator matrix for a (7, 3) systematic binary linear block code is given by $G=\begin{bmatrix}1101000\\1010100\\1100010\\1010001\end{bmatrix}$.

(i) Determine the parity check matrix for this code.

(ii) What is the minimum distance of the code?

(iii) Draw the encoder circuit.

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