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Roll No. .....

EC–503

B. E. (Fifth Semester) EXAMINATION, Dec., 2011

(Electronics & Communication Engg. Branch)

DIGITAL COMMUNICATION

(EC–503)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt *one* question from each Unit. All questions carry equal marks.

Unit–I

1. (a) Define and explain the following :
   (i) Cumulative distribution function
   (ii) Probability density function
   (iii) Variance and standard deviation of random variable

   (b) An urn contains 4 white and 3 black balls. Two balls are drawn successively with X denoting the number of black balls :
   (i) Find the probability function of X.
   (ii) Draw the bar chart and histogram.

Or

2. (a) Define and explain the following :
   (i) Correlation and autocorrelation
   (ii) Central-limit theorem
   (iii) Power spectral density of digital data

P. T. O.

(b) A fair die is tossed 5 times. A toss is called a success if face 1 or 6 appears, find :

(i) the probability of 2 successes.

(ii) the mean and standard deviation for the number of successes.

Unit – II

3. (a) Explain natural and flat tap sampling. Compare the two.

(b) Explain how PPM and PWM signals are generated (i) from PAM signals and (ii) directly.

Or

4. (a) State and prove Sampling theorem. Also explain Aliasing effect in detail.

(b) Draw and explain the PAM modulator and demodulator circuit.

Unit – III

5. (a) Explain quantization. What is qantization error ? How does it depend upon the step size and how it can be reduced.

(b) Describe delta modulation systems. What are its limitations ? How can they be overcome ?

Or

6. (a) Explain pulse code modulation system in detail. Also discuss signal to noise ratio in PCM.

(b) Compare PCM, DCPM, delta modulation, adaptive delta modulation in terms of Bandwidth and signal to noise ratio.

Unit – IV

7. (a) Discuss generation and detection, spectrum and bandwidth of amplitude shift keying.

   (b) What is matched filters ? Explain. Find its transfer function.

Or

8. (a) Explain frequency shift keying. Describe coherent detection of FSK signals. What should be the relationship between bit rate and frequency shift for a better performance.

   (b) Compare digital modulation techniques on the basis of probability of error and matched filter.

Unit – V

9. Explain spread spectrum modulation. Discuss generation and characteristics of *p-n* sequences.

Or

10. Explain any *two* of the following :

    (i) Direct sequence spread spectrum system

    (ii) Spread spectrum with CDMA

    (iii) Frequency hopping spread spectrum