K 1311

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Fifth Semester

Electronics and Communication Engineering

EC 332 — COMMUNICATION THEORY AND SYSTEMS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Draw the phasor diagram of AM–SC signal.

2. When does a carrier wave said to be overmodulated in amplitude modulation?

3. Define phase modulation.

4. Write the expression for the spectrum of a single tone FM signal.

5. Classify a random variable.

6. Name four random processes.

7. What is threshold effect in FM?

8. State the advantages of super heterodyne receiver.

9. When is the average information delivered by a source of alphabet size 2, maximum?

10. Name two source coding techniques.

PART B — ($5 \times 16 = 80$ marks)

11. Explain the generation and demodulation of FM signal.

12. (a) (i) Explain the demodulation of AM signals. (8)

(ii) Compare various amplitude modulation systems. (8)

Or

(b) (i) Explain the generation of AM signals. (10)

(ii) Explain FDM systems. (6)

13. (a) Write notes on :

(i) Random variables. (6)

(ii) Shot noise. (6)

(iii) Thermal noise. (4)

Or

(b) (i) Write notes on Random processes. (8)

(ii) Derive the noise figure and equivalent noise–temperature of cascaded stages. (8)

14. (a) (i) Explain the working of superheterodyne receiver. (10)

(ii) Explain the need for and working of pre–emphasis circuit. (6)

Or

(b) (i) Discuss the noise performance of AM system using envelope detection. (10)

(ii) Explain the need for and working of de–emphasis circuit. (6)

15. (a) Encode the following source using Shannon–fano and Huffmann coding procedure. Compare the procedures $X = \{x_1, x_2, x_3, x_4, x_5\}$, $P(X) = \{0.3, 0.1, 0.4, 0.08, 0.12\}$.

Or

(b) (i) Derive the channel capacity of a binary symmetric channel. (8)

(ii) State and prove continuous channel capacity theorem. (8)
