K 1112

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

Third Semester

Information Technology

IF 244 — PRINCIPLES OF COMMUNICATION

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State time convolution theorem.

2. Give any two properties of an impulse function.

3. Why carrier frequencies are generally selected in HF range than low frequency range?

4. Why Armstrong method of FM is superior to reactance modulator?

5. What is meant by companding? What are the two types of compander?

6. What is a matched filter?

7. What is an eye pattern?

8. Draw the phasor diagram of QPSK.

9. State the properties of cyclic code.

10. What happens to the probability of error in M-ary FSK as the value of M increases?

PART B — (5 × 16 = 80 marks)

11. (i) Distinguish between the four different classes of signals given below by their properties : (10)

(1) Periodic and non periodic

(2) Deterministic and random

(3) Energy signal and power signal

(4) Analog and digital signal.

(ii) A zero mean Gaussian white noise power spectral density No/2 is passed through an ideal low pass filter of bandwidth B. Find the autocorrelation function $y(z)$. (6)

12. (a) (i) The carrier frequency of a broadcast signal is 100 MHz. The maximum frequency deviation is 75 KHz. If the highest audio frequency modulating the carrier is limited to 15 KHz. What is the approximate bandwidth of the modulated signal? (8)

(ii) Differentiate between FM and AM. (8)

Or

(b) With block diagram explain the principle of operation of Foster-Seeley discriminator. Compare the performance with ratio detector. (16)

13. (a) With circuit schematic explain the various forms of representation of binary signal in digital transmission. (16)

Or

(b) (i) Compare DM with ADM technique. (6)

(ii) Derive an expression for the transfer function of matched filter in the presence of white noise. (10)

14. (a) Explain the generation and detection of a DPSK signal. (16)

Or

(b) Compare different classification of digital modulation schemes based on bandwidth SNR and bit error probability. State the assumptions. (16)

15. (a) The generator polynomial for a (7,4) cyclic code is $g(p) = p^3 + p + 1$ and the message code is [0110]. Generate the code in systematic form and give the syndrome calculator diagram. (16)

Or

(b) Briefly explain DS-Spread spectrum (DSSS) modulation technique and derive expression for effective jamming power and the effect of processing gain. (16)
