

# **T 8224**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Third Semester

Information Technology

IT 1202 — PRINCIPLES OF COMMUNICATION

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A broadcast radio transmitter radiates 5 KW power when the modulation percentage is 60%. How much is the carrier power?
2. What are the two major limitations of the standard form of amplitude modulation?
3. Illustrate the relationship between frequency modulation and phase modulation.
4. A carrier is frequency modulated with a sinusoidal signal of 2 kHz resulting in a maximum frequency deviation of 5 kHz. Find the bandwidth of the modulated signal.
5. Compare QASK and QPSK.
6. What are Antipodal signals?
7. State the sampling theorem for band-limited signals of finite energy.
8. How is eye pattern used to measure intersymbol interference in a data transmission system?
9. Illustrate the two modes of operation of an adaptive equalizer.
10. List out the comparison between slow and fast frequency hopping.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the process of demodulating DSBSC signal by using synchronous demodulator, with the help of neat block diagram and frequency spectrum. (12)  
(ii) Evaluate the effect of frequency error in the local oscillator on synchronous DSB demodulation. (4)

Or

- (b) (i) Explain the operation of superheterodyne receiver with neat block diagram. (12)  
(ii) Mention the drawbacks of a TRF receiver. (4)
12. (a) (i) Determine the spectrum of single tone FM wave for an arbitrary value of the modulation index  $\beta$ . (12)  
(ii) Draw the block diagram of an indirect FM transmitter. (4)

Or

- (b) (i) Explain the process of demodulating FM signal using PLL. (12)  
(ii) A 20 megahertz carrier is frequency modulated by a sinusoidal signal such that the maximum frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is 100 kHz. (4)
13. (a) (i) Explain BPSK transmitter and receiver with the help of block diagrams. (12)  
(ii) The bit stream 1011100011 is to be transmitted using DPSK. Determine the encoded sequence and transmitted phase sequence. (4)

Or

- (b) (i) Illustrate the basic idea of correlative coding by considering the specific example of duobinary signaling. (8)  
(ii) Mention the major drawback of detecting original binary sequence from the duobinary coder output and suggest a practical means of avoiding that drawback. (8)

14. (a) (i) For a full scale sinusoidal modulating signal with amplitude A, show that  $(SNR)_o = (3/2)L^2$  where  $(SNR)_o$  is the ratio of average signal power to average quantizing noise power in a PCM system and L is the number of quantizing levels. (8)

(ii) Describe baseband M-ary PAM system, for the case of quaternary ( $M=4$ ) system. (8)

Or

(b) (i) Explain about the basic elements of baseband binary PAM system with neat block diagram. (12)

(ii) Given the signal  $m(t) = 10 \cos 2000 \pi t \cos 8000 \pi t$ , what is the minimum sampling rate based on the low pass uniform sampling theorem. (4)

15. (a) (i) Draw the functional block diagram of a direct sequence spread spectrum modulator and demodulator and explain. (12)

(ii) What are the applications of spread spectrum technique? (4)

Or

(b) With the help of transmitter and receiver block diagram, explain the principle of operation (FH) frequency hopped spread spectrum system. (16)