

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009
Third Semester
Computer Science and Engineering
ANALOG & DIGITAL COMMUNICATION
(Common to Information Technology)

PART-A [each carries 2 marks]

1. Define coefficient of modulation and percentage modulation for an AM system
2. Determine the improvement in noise figure for a receiver with an RF bandwidth equal to 200KHz and an IF bandwidth equal to 10KHz
3. A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 KHz. Determine the modulation index and approximate bandwidth of the FM signal if the frequency of the modulating signal is 50 KHz.
4. How will you convert a frequency modulator into phase modulator?
5. Why are synchronous modems required for medium and high speed applications?
6. What is μ law companding?
7. Determine the bandwidth and baud for the FSK signal with a mark frequency of 49KHz and a space frequency of 51KHz and a bit rate of 2 Kbps.
8. Write the difference between PSK and FSK.
9. State the 'run property' of maximum length sequence.
10. How will you combat the effects of multi-path in a slow fading channel.

PART-B

- 11(a) (i) Define amplitude modulation. Derive the relation between the total transmitted power and carrier power in an AM system when several frequencies simultaneously modulate a carrier. [MARK 8]
- (ii) For an AM DSBFC wave with a peak unmodulated carrier voltage $V_c = 10V_p$, a load resistance $R = 10$ and a modulation coefficient $m = 1$, determine
- (1) Powers of the carrier, upper and lower side bands,
 - (2) Total powers of the modulated wave.
 - (3) Total side band power
 - (4) Draw the power spectrum. [MARK 8]
- (or)
- (b) (i) Draw the block diagram of an AM super heterodyne receiver and explain the function of each block [MARK 8]
- (ii) A super heterodyne radio receiver has a mixer that translates the carrier frequency f_c to a fixed IF frequency of 455KHz by using a local oscillator of frequency f_{LO} . The broadcast frequencies range from 540 to 1600 KHz. Determine the range of tuning that must be provided in the local

oscillator

- (1) when f_{LO} is higher than f_c and
- (2) when f_{LO} is lower than f_c . [MARK 8]

12 (a) Compare direct and indirect FM modulators. Draw the block diagram of a direct FM transmitter and describe its operation. [MARK 16]

(or)

(b) Draw the circuit diagram of a ratio detector for FM demodulation and explain. state the advantages of a ratio detector over slope detector and Foster -seeley detector.

13. (a) (i) Draw the block diagram of typical DPCM system and explain. [MARK 8]

(ii) In a binary PCM system, the output signal to quantization noise ratio is to be held to a minimum of

40 dB. Determine the number of required levels, and find the corresponding output signal to quantization noise ratio. [MARK 8]

(or)

(b) (i) Draw the eye diagram and explain its importance in data transmission [MARK 8]

(ii) Write short notes on vertical and horizontal check schemes for error detection [MARK 8]

14. (a) Draw the block diagram of a QPSK transmitter and explain. Derive the bandwidth requirement of a

QPSK system. [MARK 16]

(or)

(b) Draw the block diagram of a non-coherent receiver for detection of binary FSK signals and derive

the probability of symbol error for a non-coherent FSK system. [MARK 16]

15. (a) What is frequency hop spread spectrum? Explain the generation of slow frequency hop spread

M-ary FSK and fast frequency hop spread M-ary FSK with appropriate diagrams. [MARK 16]

(or)

(b) (i) Compare Time division Multiple access and frequency division multiple access [MARK 8]

(ii) A spread spectrum communication system has the following parameters : Information bit duration $T_b = 4.095$ ms, PN chip duration $T_c = 1$ μ s , the energy to noise ratio $E_b/N_0 = 10$.

Calculate the processing gain and Jamming margin. [MARK 8]

1. List the advantages and disadvantages of digital transmission

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2. what are the four most common methods of pulse modulation
3. what is the purpose of sample and hold circuit
4. Define aperture time and acquisition time
5. what is the difference between natural sampling and flat top sampling
6. Define droop. What causes it
7. what is Nyquist Sampling rate
8. Define and state the causes of fold over distortion
9. Define quantization and quantization error
10. Define coding efficiency
11. Define SQR
12. Define companding
13. Define A law companding and μ law companding
14. compare delta modulation PCM and standard PCM
15. Define slope overload and granular noise
16. Define adaptive delta modulation and differential PCM
17. Define eye pattern
18. Define odd parity, even parity and marking parity
19. Define VRC and LRC
20. Define forward error correction
21. Define CRC
22. Define DTE and DCE
23. List the features provided by serial interface
24. What is the difference between synchronous and asynchronous modem

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