Question Paper Code : 25079

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Computer Science and Engineering

EC 8395 — COMMUNICATION ENGINEERING

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the relationship between phase modulation and frequency modulation?

2. A signal $m(t)$, band limited to 5 kHz is multiplied by a carrier wave $\cos(w_c t)$ to yield a DSB-SC signal $S(t)$. For what value of the carrier frequency, will the bandwidth of $S(t)$ be 2% of f_c.

3. What is sampling and quantization?

4. What is meant by aliasing? How do you avoid aliasing?

5. Draw the modulated waveform representing PSK and FSK.

6. Explain the term 'ISI'? How do you alleviate ISI?

7. Define entropy.

8. What is prefix code? Give examples.

9. What is Viterbi decoding?

10. What is the aim of error control coding? List the different error control mechanisms.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the generation of SSB using Filter and phasing method. (8)

   (ii) Compare AM and Narrow band FM with phasor diagram and expressions. (5)

Or

   (b) Derive the expression for AM. Draw the spectrum and phasor diagram. Draw the waveform representing modulating signal, carrier signal and modulated signal for AM. (13)

12. (a) Explain the steps involved in PCM encoder and decoder. Derive the expression for signal to noise ratio for PCM. (13)

Or

   (b) Draw the block diagram of delta modulation and explain the working principle. Discuss the distortion occuring in delta modulation with neat waveform. Explain the ways to overcome the distortion. (13)

13. (a) Discuss the operation of QPSK modulator with neat diagram. Draw its phasor and constellation diagram. (13)

Or

   (b) Define DPSK. Draw the waveform representing DPSK. With neat diagram, explain the generation and detection of DPSK with neat block diagram. (13)

14. (a) (i) A source produces three symbols A, B and C with probabilities $P(A) = 1/2$, $P(B) = 1/4$, $P(c) = 1/4$. Determine the source entropy. (4)

   (ii) Find the entropy of a binary memory less source and find when it is maximum. (9)

Or

   (b) (i) Explain Shannon's channel capacity theorem.

   (ii) A transmission channel has a bandwidth of 4 KHz and signal to noise power ratio of 31.

      (1) how much should the bandwidth be in order to have the same channel capacity, if S/N ratio is reduced to 15?

      (2) what will be the signal to noise power ratio required if the bandwidth is reduced to 3 KHZ.

15. (a) (i) What are PN sequences? What are the properties of PN sequences? (4)

   (ii) What are the differences between FHSS and DSSS? (4)

   (iii) What are the advantages of spread spectrum? (5)

Or

   (b) Explain the various multiple access techniques with neat diagram. List the advantages and disadvantages of each technique. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the modulation technique which is used for television signal transmission. Draw the spectrum. Explain the generation and detection of the same. List the advantages and disadvantages. (15)

Or

   (b) Discuss the working principle of Superhetrodyne receiver? Explain the following terms

      (i) Sensitivity

      (ii) Selectivity

      (iii) Image signal. (15)