Question Paper Code : 42375

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Third Semester

Computer Science and Engineering

CS 2204 – ANALOG AND DIGITAL COMMUNICATION

(Regulations 2008)

(Common to PTCS 2204 – Analog and Digital Communication for B.E. (Part-Time)

Third Semester – CSE – Regulations 2009)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   **(10×2=20 Marks)**

1. A 400 W carrier is modulated to a depth of 75%. Find the total power in the modulated wave.

2. Define modulation index of FM wave.

3. What is Baud rate of FSK ?

4. Define Bandwidth efficiency.

5. What is meant by companding ?

6. Define slope overload and granular noise.

7. Differentiate connection oriented over connectionless protocol.

8. List out the features provided by the data communication modems.

9. State the applications of spread spectrum modulation.

10. Differentiate CDMA over TDMA.

PART – B   **(5×16=80 Marks)**

11. a) i) Derive the expression for the instantaneous voltage of AM wave.   (10)

    ii) Describe the relationship between the carrier and sideband powers in an AM wave.   (6)

(OR)

b) i) For an angle modulated carrier $V_C = 6\cos(2\pi 1 \times 10^6 \text{Hzt})$ with 75 KHz frequency deviation due to the information signal and a single frequency interfering signal

$V_n = 0.3 \cos(2\pi 109.985 \text{ MHz t})$, determine

   a) Frequency of the demodulated interference signal

   b) Peak phase and the frequency deviation due to the interfering signal.

   c) Voltage signal to noise ratio at the output of the demodulator. **(8)**

ii) Discuss the bandwidth requirements of angle modulated waves. **(8)**

12. a) Explain the working of FSK transmitter and different types of FSK receiver with necessary block diagram. **(16)**

(OR)

b) i) Explain the working of QPSK modulator with necessary block diagram. **(8)**

ii) What is the need for carrier recovery ? Discuss the working of Costas loop with necessary diagram. **(8)**

13. a) State the advantages and disadvantages of digital transmission and explain the working of single channel, simplex PCM transmission system in detail. **(16)**

(OR)

b) i) Define DPCM and explain the working of DPCM transmitter with block diagram. **(8)**

ii) Write short notes on : **(4×2=8)**

   i) ISI   ii) Eye pattern.

14. a) i) Describe the two station data communication circuit with necessary block diagram. **(8)**

ii) Briefly discuss the different data communication codes. **(8)**

(OR)

b) i) Define error detection. Explain the error detection techniques in data communication in detail. **(8)**

ii) Explain the working of asynchronous FSK modulation with block diagram. **(8)**

15. a) i) Explain how the pseudo random sequence is generated using necessary block diagram. **(8)**

ii) A spread spectrum communication system is characterized by the following parameters.

Duration of each information bit, $T_b = 4.095$ ms

Chip duration of PN sequence, $T_c = 1\mu s$

Calculate the processing gain and jamming margin if $(E_b/N_0) = 10$ and the average probability of error $P_e = 0.5 \times 10^{-5}$. **(8)**

(OR)

b) Elaborate the operation of m-ary FSK transmitter and receiver of FH spread spectrum with necessary block diagram. **(16)**