Reg. No.

Question Paper Code : **57243**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Third Semester

Computer Science and Engineering

CS 6304 – ANALOG AND DIGITAL COMMUNICATION

(Common to Information Technology, also common to Fourth Semester Biomedical Engineering)

(Regulations 2013)

Time : Three Hours
Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Calculate the noise voltage at the input of a television RF amplifier, using a device that has a 200 Ω equivalent noise resistance and a 300 Ω input resistor. The bandwidth of the amplifier is 6 MHz and the temperature is 17 °C.

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

3. Draw the ASK signal for the given message signal 101101.

4. Define bandwidth efficiency.

5. What are the standards organizations for data communications ?

6. Define pulse time modulation.

7. Define entropy.

8. List out the properties of cyclic codes.

1
57243

9. What is meant by frequency reuse ?

10. What is the coverage range of Bluetooth ?

PART – B (5 × 16 = 80 Marks)

11. (a) (i) The first stage of a two stage amplifier has a voltage gain of 10, a 600 Ω input resistor, a 1600 Ω equivalent noise resistance and a 27 kΩ output resistor. For the second stage, these values are 25, 81 kΩ, 10 kΩ and 1 MΩ respectively. Calculate equivalent input noise resistance of this two stage amplifier and also calculate the noise figure of the amplifier if it is driven by a generator whose output impedance is 50 Ω. **(8)**

    (ii) Derive the expression for instantaneous voltage of AM wave. **(8)**

OR

    (b) (i) Explain the nature of SSB spectrum if the modulating signal is $m(t) = \cos 2\pi.100t + \cos 2\pi.2000t$ and carrier is given by $c(t) = \cos 2\pi.10000t.$ **(8)**

    (ii) Describe the relationship between the instantaneous carrier frequency and the modulating signal for FM. **(8)**

12. (a) (i) Explain the working of BFSK transmitter and receiver with necessary equations and block diagram. **(8)**

    (ii) Differentiate coherent and non-coherent detection and compare the various digital communication systems. tomasi. **(8)**

OR

    (b) What is the significant of QAM ? Explain the operation of 8 QAM transmitter and receiver using a block diagram and truth table. **(16)**

13. (a) (i) Explain the data communication network architecture protocols and standards in detail. (8)

(ii) Describe the following data communication codes : Baudot, ASCII and EBCDIC. (8)

OR

(b) (i) For a PCM system with the following parameters, maximum analog input frequency = 4 kHz maximum decoded voltage at the receiver = ± 2.25 V and maximum dynamic range = 46 dB. Determine

(1) minimum sample rate

(2) minimum number of bits used in PCM code

(3) resolution and

(4) quantization error (12)

(ii) Compare the various pulse analog modulation techniques. (4)

14. (a) (i) The generator polynomial of a (7, 4) cyclic code is given by $G(D) = 1 + D + D$. Compute all the non-systematic codewords. (8)

(ii) Discuss the Shannon's channel capacity theorem in detail. (8)

OR

(b) Consider a systematic block code whose parity check equation are

$P_1 = m_1 + m_2 + m_4$.

$P_2 = m_1 + m_3 + m_4$

$P_3 = m_1 + m_2 + m_3$

$P_4 = m_2 + m_3 + m_4$

Where m_i is the message digits and P_i are the parity digits.

(1) Find the generator matrix and the parity check matrix for this code.

(2) How many errors can be detected and corrected ? (3) If the received code word is 10101010, find the syndrome. (16)

15. (a) Explain the GSM architecture in detail and also state the advantages and disadvantages of GSM. **(16)**

OR

(b) (i) What is need for multiple access techniques ? Explain the various classifications of multiple access techniques in detail. **(10)**

(ii) Briefly discuss the process of channel assignment in cellular networks. **(6)**

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