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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50385

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Third/Fourth Semester
Computer Science and Engineering
CS6304 – ANALOG AND DIGITAL COMMUNICATION
Common to : Biomedical Engineering/Information Technology
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. An amplifier operating over the frequency range of 455 to 460 KHz has a 200 kΩ input resistor. What is the RMS noise voltage at the input to this amplifier if the ambient temperature is 17°C ?
2. Find the modulating frequency and maximum deviation of the PM wave represented by $v(t) = 12 \sin (6 + 10^8 t + 5 \cos 1250t)$.
3. Draw the FSK signal for the binary message 1011001.
4. Define bandwidth efficiency.
5. List out the standards organization for data communication.
6. Define coding efficiency of a PCM system.
7. Calculate the entropy of four possible messages {Q1, Q2, Q3, Q4} which is transmitted with probabilities {1/8, 3/8, 3/8, 1/8}.
8. What is the principle advantage of sequential decoding of convolution code ?
9. Differentiate GSM over CDMA.
10. What is Bluetooth technology ? And mention its application.

PART – B (5×13=65 Marks)

11. a) i) Derive the expression for the instantaneous voltage of AM wave. (7)

ii) For an AM DSBFC transmitter with an unmodulated carrier power Pc = 100W that is modulated simultaneously by three modulating signals with coefficients of modulation m1 = 0.2, m2 = 0.4 and m3 = 0.5, determine :

1) Total coefficient of modulation
2) Upper and lower sideband power
3) Total transmitted power. (6)

(OR)

b) i) Draw the block diagram of Armstrong indirect FM transmitter and describe its operation. (9)

ii) Discuss the advantages and disadvantages of angle modulation. (4)

12. a) i) A BPSK modulator with a carrier frequency of 70 MHz and an input bit rate of 10 Mbps, determine the following :

1) maximum and minimum upper and lower side frequencies
2) minimum Nyquist bandwidth and
3) Baud rate. (6)

ii) With a block diagram explain the working of coherent binary FSK transmitter and receiver. (7)

(OR)

b) i) Determine the baud, minimum bandwidth and bandwidth efficiency for an 8-PSK system operating with an information bit rate of 24 kbps. (6)

ii) Draw the block diagram of 8-QAM transmitter and explain its working. (7)

13. a) i) Describe the following data communications codes : Baudot, ASCII and EBCDIC. (6)

ii) Explain the generation of PCM signal with a block diagram. (7)

(OR)

b) i) Explain the working of a two station data communication circuit with a block diagram. (7)

ii) Describe the generation and demodulation of PPM signal with necessary waveforms. (6)

14. a) Five source messages are probable to appear as m1 = 0.4, m2 = 0.15, m3 = 0.15, m4 = 0.15, and m5 = 0.15. Determine the coding efficiency for

1) Shannon-Fano coding
2) Huffman coding (13)

(OR)

b) i) Derive the expression for mutual information and channel capacity. (7)

ii) What are the types of error control coding ? Describe the working of viterbi decoding algorithm. (6)

15. a) i) Briefly describe the advanced mobile telephone system. (6)

ii) Discuss in detail about the architecture of GSM with necessary diagram. (7)

(OR)

b) i) Describe the concept of frequency reuse, channel assignment and hand-off in a cellular system. (7)

ii) Briefly discuss about the different multiple access schemes. (6)

PART – C (1×15=15 Marks)

16. a) i) The first stage of a two-stage amplifier has a voltage gain of 10, a 600Ω input resistor, a 1600Ω equivalent noise resistance and a 27kΩ output resistor. For the second stage, these values are 25,81kΩ, 10kΩ and 1MΩ respectively. Calculate the equivalent input noise resistance of this two stage amplifier. (5)

ii) Write short notes on :

1) Data communications hardware
2) Serial and parallel interface. (10)

(OR)

b) i) Draw the block diagram of CDMA encoder and decoder and briefly explain its working. (8)

ii) Briefly discuss the generation of convolution code with an example. (7)

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