Reg. No. :

Question Paper Code : X 20394

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Third/Fourth Semester
Computer Science and Engineering
CS 6304 – ANALOG AND DIGITAL COMMUNICATION
(Common to Information Technology and Fourth Semester Biomedical Engineering)
(Regulations 2013)

Time : Three Hours — Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. List the sources of external and internal noise.
2. Differentiate frequency and phase modulation.
3. State the significance of constellation diagram.
4. What is bandwidth efficiency ?
5. State the need for companding in a PCM system.
6. Mention how PPM is derived from PWM.
7. Define entropy.
8. List out the properties of cyclic codes.
9. What are all the essential components of GSM ?
10. Draw the block diagram of CDMA transmitter and receiver.

PART – B **(5×13=65 Marks)**

11. a) Explain the operation of Super heterodyne receiver.

(OR)

b) Explain the principle of AM modulation with mathematical analysis. Draw the AM wave and explain its power distribution.

12. a) Draw the constellation diagram of QPSK modulation and explain the QPSK modulation and demodulation of QPSK.

(OR)

b) Explain the method of generation of QAM and the demodulation of the same.

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

ii) Discuss the various data communication codes and its significance. **(6)**

(OR)

b) i) Describe the two methods of error correction in data communication. **(6)**

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

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. **(7)**

ii) Discuss the Shannon's channel capacity theorem in detail. **(6)**

(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. **(3)**
2) How many errors can be detected and corrected ? **(5)**
3) If the received code word is 10101010, find the syndrome. **(5)**

15. a) Explain in detail about the function of each layer in a Bluetooth system.

(OR)

b) Explain about GSM protocol architecture in detail.

PART – C **(1×15=15 Marks)**

16. a) The generator polynomial of a (15, 11) Hamming code is defined by $g(X) = 1 + X + X^4$. Develop the encoder and syndrome calculator for this code, using a systematic form for the code. Generate the code word for the message vector (1111 1111 111) using the developed encoder. Find the output of the designed syndrome calculator for the received code word (1111 1111 1111 111).

(OR)

b) The source of information A generates the symbols $\{A_0, A_1, A_2, A_3$ and $A_4\}$ with the corresponding probabilities {0.4, 0.3, 0.15, 0.1 and 0.05}. Encoding the source symbols using binary encoder and Shannon-Fano encoder and compare its efficiency.