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Question Paper Code: 2055215

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Third Semester
Information Technology
EC8394 – ANALOG AND DIGITAL COMMUNICATION
(Regulation 2017)

Time: Three Hours | Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

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

2. State the advantages of FM modulation.

3. State the need for companding in a PCM system.

4. List out the different types of data communication codes.

5. What is Baud rate of FSK?

6. Mention the advantages of digital transmission.

7. A source of four messages with probabilities {1/8,3/8,3/8,1/8}. Find the entropy of the source.

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 x 13 = 65 Marks)

11. (a) Explain the operation of Super heterodyne receiver. (13)

(OR)

(b) Explain the principle of AM modulation with mathematical analysis. Draw the AM wave and explain its power distribution. (13)

12. (a) (i) Explain the working of a simplified two-station data communication circuit. Explain the various data transmission modes. (8)

(ii) Briefly write on standard organisations for data communications. (5)

(OR)

(b) (i) Explain the working of PCM transmitter. (8)

(ii) Define PAM, PCM and PTM. (5)

13. (a) Explain the generation and reception of binary phase shift keying signal with necessary block diagram. (13)

(OR)

(b) (i) Define QAM and explain the generation of 8-QAM signal with necessary block diagram. (8)
(ii) Compare the different digital modulation systems in terms of bandwidth, noise immunity, bit rate and error probability. (5)

14. (a) Consider a $(5,1)$ linear block code defined by the generator matrix, $G = [11111]$.
(i) Find the parity check matrix H of the code in systematic form.
(ii) Find the encoding table for the linear block code.
(iii) What is the minimum distance $d\text{min}$ of the code. How many errors can the code detect. How many errors can the code correct.
(iv) Find the decoding table for the linear block code (consider single bit errors only).
(v) Suppose $c = [1 \quad 1 \quad 1 \quad 1 \quad 1]$ is sent and $r = [0 \quad 1 \quad 1 \quad 1 \quad 1]$ is received. Show how the code can correct this error. (13)

(OR)

(b) What is source coding? Explain the steps involved in Shannon Fano coding with suitable example. (13)

15. (a) Explain in detail about the function of each layer in a Bluetooth system. (13)

(OR)

(b) Explain about GSM protocol architecture in detail. (13)

PART – C (1 x 15 = 15 Marks)

16. (a) Design a CDMA network for a dense urban environment. How would you manage interference and ensure optimal user capacity? (15)

(OR)

(b) Design a dynamic channel allocation strategy for a cellular network to manage variable user density in real time. (15)

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