Faculty of Engineering & Technology
Fourth Semester B.E. (Electronics Engineering)/ET/EC
(C.B.S.) Examination
SIGNAL AND SYSTEM
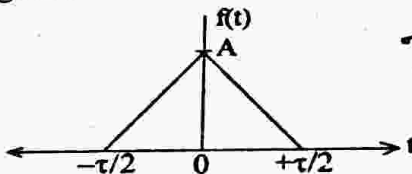
Time—Three Hours]   [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Answer SIX questions.

(3) Due credit will be given to neatness and adequate dimensions.

(4) Assume suitable data wherever necessary.

(5) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) State the prove sampling theorem for band-limited signal.   8

    (b) State and explain time convolution theorem and frequency convolution theorem.   6

OR

2. (a) Find the Fourier transform of triangular pulse shown in figure :

$$\frac{2A}{\tau}\frac{\left(e^{\tau/2} - e^{-\tau/2}\right)}{\omega^2}$$

8

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(b) State and prove scaling property of Fourier transform. What is physical significance of this property ? 6

3. (a) What is probability density function ? Give its any two properties. 4

(b) What is importance of autocorrelation function of Random Process ? 7

(c) Define the term Random Process. 2

OR

4. (a) A coin is tossed four times in succession. Determine the probability of obtaining exactly two heads. 6

(b) Differentiate between random process and random variables by giving suitable examples of both. 7

5. (a) The data 110100101 is to be transmitted. Draw resulting waveform for the following methods :

(i) Unipolar NRZ

(ii) Polar RZ

(iii) Polar NRZ

(iv) Bipolar NRZ

(v) Split Phase Manchester. 10

(b) Explain in brief the properties of Line Coding. 3

OR

6. (a) Explain Nyquist first criterion for zero ISI. 8

(b) Write short notes on adaptive equalization. 5

7. (a) Explain square law demodulation. 5

(b) What are the advantages of SSB over DSB. 3

(c) Write short note on Delta Modulation. 5

OR

8. (a) What is SSB-SC signal ? Explain any one method of SSB-SC generation. 7

   (b) Explain coherent detection method of DSB-SC wave. 6

9. (a) Explain in brief differential PSK(DPSK). Draw block diagram of DPSK system. Discuss advantages and disadvantages of DPSK. 9

   (b) Write short note on M-ary communication system. 4

OR

10. (a) Draw ASK, PSK and FSK waveform for binary sequence :
   (i) 1011001
   (ii) 0010100
   (iii) 1001111 9
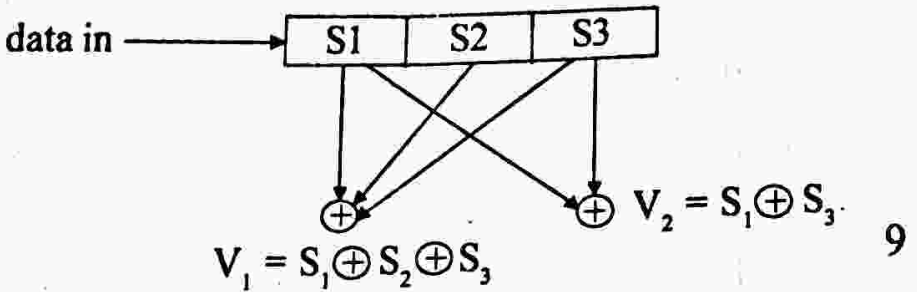
   (b) Explain generation method of FSK in brief. 4

11. (a) What is Shannon's channel capacity theorem ? What is its importance ? 8

   (b) A zero memory source emmits six messages with probabilities 0.3, 0.25, 0.15, 0.12, 0.1 and 0.08. Find the 4-ary(quaternary) Huffman code. Determine its average word length, the efficiency and redundancy. 6

OR

12. (a) For the given convolution encoder, draw the code tree, state diagram and Trellis diagram :

data in ⟶ | S1 | S2 | S3 |

$V_1 = S_1 \oplus S_2 \oplus S_3$

$V_2 = S_1 \oplus S_3$

9

(b) Write short note on any **ONE** :

(i) Cyclic code

(ii) Linear Block code.

5