B.E. (Electronics Engineering / Elect. Telecommunication / Elect. Communication Engineering)
Fourth Semester (C.B.S.)

Signal & Systems

P. Pages : 2

NRT/KS/19/3357/3362

Time : Three Hours

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Max. Marks : 80

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) State and 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. **8**
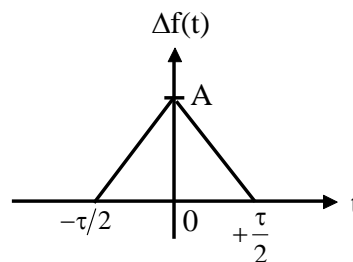
b) State and prove scaling property of Fourier transform. What is physical significance of this property? **6**

3. a) What is probability density function? Give it's any two properties. **4**

b) What is importance of auto correlation 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 **10**
methods
   i)   Unipolar NRZ   ii)   Polar RZ
   iii) Polar NRZ   iv)   Bipolar RZ
   v)   Split phase Manchester

   b) Explain in brief the properties of line coding? **3**

<div align="center">OR</div>

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**

<div align="center">OR</div>

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 **9**
advantages and disadvantages of DPSK.

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

<div align="center">OR</div>

10. a) Draw ASK, PSK & FSK waveform for binary sequence **9**
   i)   1011001   ii)   0010100   iii)   1001111

   b) Explain generation method of FSK in brief. **4**

11. a) What is Shannon's channel capacity theorem? What is it's importance? **8**

   b) A zero memory source emits six messages with probabilities 0.3, 0.25, 0.15, 0.12, 0.1 & **6**
0.08. Find the L-ary (quaternary) Huffman code. Determine it's average word length, the
efficiency and redundancy.

<div align="center">OR</div>

12. a) For the given convolution encoder, draw the code tree, state diagram and trellis diagram. **9**
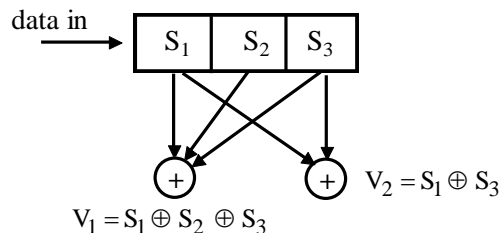
   b) Write short note on **any one.** **5**
   i)   Cyclic code
   ii)   Linear Block code.

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