B.E. Electronics & Telecommunication / Communication Engineering / Electronics Engineering
Fifth Semester

ET/EN 505 - Theory of Communication Engineering

P. Pages : 2 **GUG/W/18/1625**

Time : Three Hours * 1 2 7 9 * Max. Marks : 80

Notes : 1. All questions carry equal marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain AM with suitable expression & draw its time domain waveform. **8**

b) Explain linear diode detector with neat ckt diagram & waveforms. **8**

OR

2. a) Explain VSB modulation & demodulation with waveforms & block diagram. **8**

b) Describe TDM & FDM with the help of block diagram which is more superior ? Why ? **8**

3. a) Explain Parseval's Theorem for energy signals & derive the relation. **8**

b) Explain the power density spectrum & derive the relation. **8**

OR

4. a) Define line coding & give classification of line codes ? Give characteristics of line coding system. **8**

b) The data 11011000 is to be transmitted. Draw the resulting waveforms for the following methods. **8**
i) Unipolar RZ & NRZ
ii) Polar RZ & NRZ
iii) Bipolar RZ & NRZ
iv) Split phase Manchester

5. a) Explain conditional probability & Independent Events in brief. **8**

b) Explain cumulative distribution function (CDF) & continuous random variables. **8**

OR

6. a) Explain statistical average (means) of random variables. **8**

b) Explain Autocorrelation of a Random process in brief. **8**

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7. a) Explain PCM with block diagram & neat waveforms. **8**

b) Explain and draw a block diagram of DM (Delta Modulation). Also explain its limitations. **8**

OR

8. a) Explain ASK, FSK & PSK in brief with waveforms. **8**

b) Explain DPSK system in brief with block diagram & waveforms. **8**

9. a) What is Information Theory & Derive the expression for Information with its units. **8**

b) What is Entropy ? Derive the expression for Entropy explain its properties. **8**

OR

10. a) For a linear block code, the generator matrix G is given by - **8**

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

Find all the code wards & draw the diagram for the encoder.

b) Solve by the Huffman coding method for M=2. The probability for all messages is given by 0.4, 0.2, 0.12, 0.08, 0.08, 0.08, 0.04 **8**

Find :

i) Average length of message (I)

ii) Entropy H(x)

iii) Efficiency (n)

iv) Redundancy (r)

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