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Printed Pages : 4 **TEC – 601**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3091 Roll No.

B. Tech.

(SEM. VI) EXAMINATION, 2006-07

DIGITAL COMMUNICATION

Time : 3 Hours] *[Total Marks : **100***

Note : *Attempt **all** questions.*

1. Attempt any **four** parts of the following:-

(a) A binary symmetric channel (BSC) error probability is Pe. The probability of transmitting **1** is **Q** and that of transmitting **O** is **1-Q.** Determine the probabilities of receiving 1 and **O** at the receiver. **5**

(b) Explain Huffmann coding with the half of an example. **5**

(c) Prove that the average number of digits required per message emitted from a source is equal to entropy of the source (in bits) **5**

(d) Explain the following terms : **5**

(i) Channel capacity

(ii) Ergodic Random Process.

(e) A random variable x is having uniform probability density function in range [-1, 1] Find mean and variance of the random variable. **5**

(f) What are advantages of digital communication over analog communication? **5**

2. Attempt any **four** parts of the following:

(a) Explain Delta Modulation scheme with block diagram for modulation. **5**

(b) Describe matched filter, receiver with diagram. **5**

(c) What should be the desirable properties of a line code? **5**

(d) What are different Nyquist criteria for zero Inter Symbol Interference (ISI). **5**

(e) Sketch appropriate wave forms for a sequence 111000110 using unipolar, and Manchester line coding schemes. **5**

(f) Write a short note on Raised Cosine Spectrum. **5**

3. Attempt any **two** parts of the following:

(a) Explain in short what do you understand by amplitude shift keying, and phase shift keying. **10**

(b) Classify quadrature modulator technique. Explain with a block diagram quadrature amplitude shift keying. **10**

(c) Calculate probability of error in presence of white noise for a binary phase shift keying signal and quadrature phase shift keying. **10**

4. Attempt any **two** parts of the following:

(a) What do you mean by Time Division Multiplexing and how it is related to Nyquist sampling theorem? What is electronic commutator? **10**

(b) (i) Explain T1 frame format and also discuss T1 super frame structure. **5**

(ii) Write a note on T TDM PCM hierarchy from T1 to T4. **5**

(c) Write down the various applications of Radar. Discuss briefly about any two Radar transmitters. **10**

5. Attempt any **four** parts of the following:

(a) Explain generation and coding of cycling codes. **5**

(b) For a (6, 3) code, the generator matrix **5**

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

Find all eight code words corresponding to eight data words

(c) Write a short note on tree diagram. **5**

(d) Find a generator polynomial g(n) for a (7,4) cyclic code and find code vectors for the following data vectors. 1010,1111,0001 and 1000. **5**

(e) Write a short note on Hamming codes. **5**

(f) What do you mean by : **5**

(i) Linear code

(ii) Generation mature.
