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

PAPER ID : 1033 Roll No. | | | | | | | | | | |

B.Tech.

FOURTH SEMESTER EXAMINATION, 2005-2006

FUNDAMENTAL OF COMPUTER COMMUNICATION SYSTEM

Time : 2 Hours *Total Marks : 50*

Note : *(i) Attempt **ALL** questions.*

(ii) In case of numerical problems assume data wherever not provided.

(iii) Be precise in your answer.

1. Attempt ***any four*** parts of the following : **(3.5x4=14)**

(a) What is the difference between continuous and discrete signal. Illustrate them using suitable example.

(b) What is random process ? Discuss the significance of Poisson process and Wiener process.

(c) Explain the term Information and Entropy and relate them.

(d) An analog signal is band limited to BHz, sampled at the Nyquist rate and the samples are quantized into 4 level with the probabilities $p_1 = p_2 = \frac{1}{8}$ and $p_3 = p_4 = \frac{3}{8}$. Find the information rate of the source.

(e) Define Shannon's theorem. Prove that the capacity of Gaussian channel is

$C = B \log_2 (1 + S/N)$ and

Average amount of information

$$H = \frac{1}{2} \log_2 \left(1 + \frac{12}{\lambda^2} \cdot \frac{S}{N} \right)$$

When each message is equally likely.

(f) With the help of waveforms explain PWM, PPM, PCM modulation schemes.

2. Attempt *any four* parts of the following : **(3x4=12)**

(a) What are Base Band signals. Why frequency translation is required for transmitting signals to a distant place and how it is achieved ?

(b) What are the various methods of multiplexing the channels in a wide Band channel. Explain their salient features.

(c) What is Inter symbol Interference and in which type of multiplexing it is present ? How it can be minimized ?

(d) How digital modulation is better than Analog Modulation ? Explain binary phase shift keying and its generation.

(e) Explain in brief about the following :

(i) Synchronization

(ii) Scrambler

(iii) Unscramble

(f) With the help of block diagram explain the working of M-ary PSK receiver.

3. Attempt *any two* parts of the following : **(6x2=12)**

(a) With the help of suitable example explain Galois fields, vector space and matrices. What is the importance of coding in any communication system ?

(b) Explain Block codes. What is Hamming distance ? Show that for hard decision decoding of a (7, 4) Hamming code the probability of 2 or more errors is at least a factor of 10 less than the probability of a single error if $P \leq Po$. Find Po.

(c) What is Burst error correction ? When it is required and how it is achieved ? What are Algebraic codes and how it is generated ?

4. Attempt *any two* parts of the following : **(6x2=12)**

(a) What are the basic types of communication networks services. Explain them. Compare synchronous and Asynchronous transmission schemes. Discuss about the design issues of any Computer Communication Network.

(b) With the help of Block diagram discuss ISDN and LAN. What are connection oriented Networks ? Compare the frame structure of X.25, frame relay and ATM Networks.

(c) Describe OSI reference model and compare it with TCP/IP reference model. Differentiate between Hub and Router.

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