

Printed pages: 3

EEC049(B)

(Following paper code and roll No. to be filled in your answer book)

Paper code: 120752

Roll No.

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B TECH
(SEM VII) THEORY EXAMINATION 2014-15
DIGITAL COMMUNICATION

TIME: 3 Hours

Total Marks: 100

Note: Attempt all the questions. All questions carry equal marks.

1. Attempt any four parts.

5X4

- With the help of block diagram explain the working of digital communication system.
- Explain conditional probability and Bay's rule? What are independent events?
- An event has six possible outcomes with probabilities $p_1=1/2$, $p_2=1/4$, $p_3=1/8$, $p_4=1/16$, $p_5=1/32$. Find the entropy of the system also find the rate of information if there are 16 outcomes per second.
- 8 channels each bandlimited to 5 KHz, are to be time division multiplexed. Each sample is coded into a 6 bit word. Find the output rate in bits/sec and the required bandwidth.
- The spectral range of a bandpass signal extends from 10.0 MHz to 10.04 MHz. Find the minimum sampling rate.
- Discuss the properties of matched filter.

2. Attempt any two parts of the following. 10X2

- Describe delta modulation systems. Explain the importance of Companding technique.
- Discuss the Nyquist criterion of Zero ISI .Derive an expression for impulse response of the matched filter.
- Discuss the properties of line coding. Given that the bit sequence gives below is to be transmitted.bit sequence =1 0 1 1 0 0 1 0. Draw the resulting waveform, if the sequence is transmitted using (i) Unpolar RZ (ii) Polar RZ.

3. Attempt any two parts of the following. 10X2

- Explain the different type of digital carrier modulation schemes giving their merits and demerits for transmitting data on band pass channel. Describe coherent detection of FSK signals.
- Draw the block diagram of QPSK system and explain its working? Compare the bandwidth of QPSK system with that of BPSK system.
- Differentiate between Base-band and Band-pass data transmission system. An FSK System transmits binary data at the rate of 2.5×10^6 bits per second. During the course of transmission, white Gaussian noise of zero mean and power spectral density 10^{-20} W/Hz is added to the signal. In the absence of noise, the amplitude of the received sinusoidal wave for digit 1 or 0 is 1 mV. Determine the average probability of symbol error for the Non coherent binary FSK system configuration.

4. Attempt any two parts of the following. 10X2

- a. Explain Multiplexing? What are the advantages of TDM over FDM. Explain synchronous and asynchronous time division multiplexing of PCM signals.
- b. Describe PCM hierarchy and T-1 carrier system.
- c. Write short notes on Synchronization and bit interleaving.

5. Attempt any two parts of the following. 10X 2

- a. (i) Define the following terms : (i) Entropy (ii) channel capacity.
(ii) Verify equations that is
$$I(X:Y) = H(Y) + H(X) - H(X,Y).$$
- b. Determine the Huffman code for the following message with their probabilities given

x1	x2	x3	x4	x5	x6	x7
0.05	0.15	0.2	0.05	0.15	0.3	0.1
- c. Write short notes on. (i) Cyclic codes (ii) Trellis