Total No. of Questions : 10 ] [ Total No. of Printed Pages : 3



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# EC–503(N)

## B. E. (Fifth Semester) EXAMINATION, Dec., 2010

**(New Scheme)**

**(Electronics & Communication Engg. Branch)**

DIGITAL COMMUNICATION

**[EC – 503(N)]**

*Time : Three Hours*

*Maximum Marks : 100*

*Minimum Pass Marks : 35*

**Note :** Attempt *one* question from each Unit. All questions carry equal marks.

**Unit – I**

1. (a) Obtain the expression of variance of a random variable.

   (b) A binary source generates digits 1 and 0 randomly with probabilities 0·6 and 0·4 respectively :

   (i) What is the probability that two 1's and three 0's will occur in a five digit sequence ?

   (ii) What is the probability that at least three 1's will occur in a five digit sequence ?

*Or*

2. (a) Obtain the expression of power spectral density of NRZ data and draw its spectrum.

P. T. O.

(b) Find the probability of 4 to 7 heads inclusive in 10 tosses of a fair coin.



## Unit – II

(a) Discuss the sampling and reconstruction of a low pass signals.

(b) Explain the principle of flat topped sampling and elaborate about aperture effect.

*Or*

(a) Explain cross talk generated due to HF cutoff of the channel.

(b) With the help of circuit diagram explain pulse width modulation.

## Unit – III

(a) With the help of block diagram explain the PCM communication system.

(b) What is companding ? Calculate the expression of signal to quantization noise ratio.

*Or*

(a) Explain delta modulation with the help of a block diagram.

(b) A voice frequency signal band limited to 3 kHz is transmitted with the use of the DM system. The pulse repetition frequency is 30000 pulses per second and the step size is 40 mV. Determine the maximum permissible speech signal amplitude to avoid a slope overload.

## Unit – IV

Explain the generation and reception of DPSK signal. Justify how the error rate of DPSK is greater than PSK.

*Or*

8. With the help of block diagram explain the transmission and reception of QPSK signal. Justify how the transmission bandwidth of QPSK system is reduced.

**Unit – V**

9. (a) Discuss the principle of DS-spread spectrum.

   (b) How is DS spread spectrum used for ranging ?

*Or*

10. (a) Discuss the single tone interference in DS-spread spectrum signal. What is effective jamming power ?

    (b) Compare DS spread spectrum and FH spread spectrum.