Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE)/(ETE) (2011 Onwards)

B.Tech.(Electronics Engg.) (2012 Onwards)

(Sem.–5)

DIGITAL COMMUNICATION SYSTEM

Subject Code : BTEC-501

Paper ID : [A2103]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION–A

1. Write briefly :

a) What is Nyquist rate?

b) With diagram define the term Aliasing.

c) What is Granular noise in Delta modulation?

d) For the binary bit stream 10011011, draw the wave forms for Polar NRZ and Manchester RZ format.

e) Write desirable properties of line codes.

f) Draw power spectrum of BPSK and QPSK signals.

g) What is the relation between BER and SYMBOL error rate?

h) Why MSK is called shaped QPSK?

i) Write the basic difference between Bandpass transmission and Passband transmission.

j) What is the difference between Line coding and source coding?

SECTION–B

2. State and prove the sampling theorem in frequency domain. Show that the effect of sampling is to produce double sided spectra around each harmonic of sampling frequency.

3. A DMS X has four symbols x_1, x_2, x_3, x_4 with probability P $(x_1) = \frac{1}{2}$, P $(x_2) = \frac{1}{4}$, P$(x_3) = \frac{1}{4}$, P $(x_4) = \frac{1}{8}$. Construct a Shannon- Fano code for X; Show that this code has the optimum property that $n_i = I(x_i)$ and the code efficiency is 100 percent.

4. Why MSK is called shaped QPSK? For MSK, explain expression and wave forms for the signal 11000111.

5. Derive an expression for signal to quantization noise ratio for a PCM system which employs Uniform quantization technique. Input to the PCM system is a sinusoidal signal.

6. Show that Error probability of PSK system is $P_e = \frac{1}{2} erfc \sqrt{\frac{E}{N_0}}$.

SECTION–C

7. Explain Delta modulation in detail with suitable diagram. Explain ADM and compare its performance with DM.

8. Explain QPSK system with its transmitter, receiver and signal space representation.

9. Draw block diagram of a Matched filter receiver and prove that output of matched filter is $r(T) = \frac{2k}{N_0} \int_0^T f(t) x(t) dt$.