Code No.: 9A04601/R09

III B.Tech. II Semester Regular and Supplementary Examinations

Set-4

April/May - 2013

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours | Max. Marks: 70

*Answer any **FIVE** Questions*

*All Questions carry **Equal** Marks*

- - -

1. (a) What is aliasing effect in sampled signal?
   (b) How aliasing can be eliminated? Explain with neat diagram.

2. (a) Explain the basic principle of DPCM.
   (b) What is meant by bandwidth efficiency of a digital multiplexing system?
   (c) Derive an expression for channel noise in delta modulation.

3. (a) Distinguish between passband and baseband transmission.
   (b) Derive the power spectral density of NRZ unipolar format.

4. (a) What is a raised-cosine pulse? Describe with the help of diagram.
   (b) Compare binary signaling with duo binary signaling.
   (c) An analog signal band limited to 6 kHz, is sampled at a rate of 20×10^3 SPS. The samples are then quantized into 256 levels and coded into M ary amplitude pulses that satisfy Nyquist's criterion with a roll off factor $\rho = 0.3$, if these multi amplitude pulses are to be transmitted over an available channel that has a bandwidth of 32 kHz, determine the minimum acceptable value of M.

5. (a) What are the convolution codes? Explain various methods of decoding convolution codes.
   (b) What are burst and random error correcting codes? Explain.

6. (a) What is source encoding? What is its significance? Compare different source encoding algorithms.
   (b) Apply the Shannon-Fano coding for the following message ensemble and calculate the efficiency.
   $[X] = [x_1, x_2, x_3, x_4, x_5, x_6, x_7]$
   $[P] = [0.4, 0.2, 0.12, 0.08, 0.08, 0.08, 0.04]$.

7. (a) Derive an expression for probability of error in FSK system.
   (b) Show that BPSK is superior to ASK by 3 dB in the average signal power requirement with appropriate mathematical derivations.

8. Explain about M-ary FSK system and derive an expression for probability of error.