Code: 9A04601

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1   (a)   State sampling theorem for low pass signals and band pass signals and prove it.
    (b)   What is aliasing effect in sampled signal?
    (c)   A signal m(t) = cos(200πt) + 2 cos(320πt) is ideally sampled at f_s = 300 Hz. If the sampled signal is passed through a low pass filter with a cutoff frequency of 250 Hz. What frequency components will appear in the output?

2   (a)   Draw the block diagram of delta modulation system and explain its working.
    (b)   A decimal number N was transmitted using seven bit even parity Hamming code. After transmission, it was received as 1101101. Is there any error introduced during transmission? What is the value of N?

3   (a)   With the help of a block diagram, explain Baseband Binary data Transmission System?
    (b)   An analog signal is PCM formatted and transmitted using binary waveforms over a channel that is band limited to 100 KHz. Assume that 32 quantization levels are used and that the overall equivalent transfer function is of the raised cosine type with roll off of 0.6. Find:
          (i) The maximum bit rate that can be used by this system without introducing ISI.
          (ii) The maximum bandwidth of the original analog signal that can be accommodated with these parameters.

4   (a)   What is correlative coding? Explain it in detail.
    (b)   For input binary data 1011101, obtain the output of Duobinary encoder and also the output of decoder.

5   Explain about Forward Error Correction Systems with comparison.

6   (a)   Derive the condition for encoding the stationary source.
    (b)   Calculate the coding efficiency of the following codes and construct the decision tree.

Symbol	Probability	Code1	Code2
X_1	1/2	0	00
X_2	1/4	10	01
X_3	1/8	110	10
X_4	1/8	111	11

7   (a)   Explain the carrier synchronization techniques used in the digital systems.
    (b)   Sketch the block diagram of optimum receiver and explain the operation.

8   How will you differentiate binary FSK and MFSK? Explain with block diagrams.