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Seat No.	

T.E. (Electronics and Telecommunication Engg.)

(Pre-revised) (Semester-VI) (Old) Examination, April - 2016

DIGITAL COMMUNICATION

Sub. Code: 45693

Day and Date : Monday, 18- 04 - 2016 **Total Marks : 100**

Time : 3.00 p.m. to 6.00 p.m.

Instructions : 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**

SECTION-I

Q1) Solve Any Two:

a) Explain Binomial and Poission probability distribution model. **[8]**

b) Explain physical significance of power spectral density. Also state any two properties of power spectral density. **[8]**

c) Assume that 8 digit binary words are being transmitted over a noisy channel, with a per digit error probability of 0.01. Calculate the probability that 3 digits out of 8 are in error. Also find the values of mean and variance of a random variable representing the number of errors. Use Binomial Distribution. **[8]**

Q2) Solve Any Two:

a) Derive the expression for mutual information. **[8]**

b) With an example, explain Huffman Coding Technique. **[8]**

c) Explain types of channels and their models. **[8]**

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Q3) Solve Any Two:

a) Explain in detail Uniform Quantization. **[9]**

b) Explain with block diagram PCM transmitter and receiver. **[9]**

c) What is slope overload distortion and granular noise in Delta modulation? Explain how it is removed in ADM. **[9]**

SECTION-II

Q4) Solve Any Two:

a) Explain with block diagram BPSK transmitter and receiver. **[8]**

b) Compare ASK, FSK and PSK. **[8]**

c) Explain with block diagram QAM transmitter and receiver. **[8]**

Q5) Solve Any Two:

a) Draw and explain Scrambler and unscrambler implementation using shift register structure. **[8]**

b) Discuss the properties and applications of matched filter. **[8]**

c) Explain Syndrome Decoder for (n, k) block codes. **[8]**

Q6) Solve Any Two:

a) Explain Encoder for an (n, k) cyclic code. **[9]**

b) The parity check matrix of a particular (7, 4) linear block code is given by $[H] = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$ [9]

Find:

i) The generator matrix [G].

ii) List all the code vectors.

iii) What is the minimum distance between the code vectors?

iv) How many errors can be datected?

c) Sketch the encoder and syndrome calculator for the generator polynomial $g(x) = 1 + x^2 + x^3$ and obtain the syndrome for the received codeword 1001011. [9]

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