

Roll No.

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M.Tech. (ECE) EL-II (2018 & Onwards Batch) (Sem.-I)

INFORMATION THEORY AND CODING

Subject Code : MTEC-PE2Y-18-3

M.Code : 75179

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

Q1 With the help of neat block diagram, explain the operation of PCM encoder and decoder. Compare PCM with delta modulation on the basis of quantization error, bandwidth efficiency, system complexity and applications.

Q2. A source X generates nine different messages ($x_i, i = 1, 2, \dots, 9$) with probabilities $p(x_i) = \{0.23, 0.19, 0.17, 0.16, 0.1, 0.07, 0.02, 0.06\}$. Construct a Huffman code for X, and calculate the efficiency of the code.

Q3 Define Information and Mutual Information. State Shannon-Hartley theorem of channel capacity. Derive an expression for maximum capacity of a noisy channel.

Q4 State Sampling theorem and illustrate how the original signal is reconstructed from its sampled version. What is aliasing error and aperture effect distortion?

Q5 Explain the Nyquist's criteria for distortion less baseband transmission. How eye pattern used to evaluate ISI? How base band shaping is helpful in data transmission?

Q6 Explain in detail the detection and generation of MQAM signal. Compare MPSK and MQAM modulation technique on the basis of bandwidth efficiency, symbol error probability and receiver complexity.

Q7 What is the advantage of orthogonal signaling? Derive an expression of bit error and symbol error probability for QPSK.

Q8 Explain encoding and decoding of cyclic codes. Explain Viterbi decoding algorithm for convolution codes.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.