Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(ECE) (Sem.–2)

INFORMATION THEORY & CODING

Subject Code : EC-509

M.Code : 36210

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

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

Q1 Explain the block diagram of modulator and demodulator of pulse code modulation. Also derive the output signal-to- quantization noise ratio for pulse code modulation. 20

Q2 Explain :

a) Prediction and adaptive filter 10

b) Nyquist criterion for zero inter symbol interference 10

Q3 a) Explain baseband and band-pass sampling theorems. 8

b) Explain time division multiplexing and the role of sampling theorem in this for speech signal. 12

Q4 Calculate the average code word length and coding efficiency for the message ensemble (for M = 2) using Huffman coding scheme. 20

$[X] = [\ x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7\ ]$

$[P] = [\ 0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04\ ]$

Q5 Explain :

a) Amount of information (*i.e.*, self information) 6

b) Trellis code 7

c) Viterbi decoding algorithm 7

Q6 a) Differentiate between bit and symbol error probability. Find the relation between the two for BPSK and QPSK modulation schemes. 14

b) Compare the bandwidth efficiency of BPSK, BFSK, QPSK and 16-PSK. 6

Q7 Differentiate between coherent and non-coherent detection. Evaluate the probability of error for coherent M-ary phase shift keying modulation technique under AWGN channel characteristics. 20

Q8 Differentiate between linear block codes, cyclic codes and convolution codes with proper explanation. 20

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.