Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VI EXAMINATION – WINTER 2015

Subject Code:X61101 **Date:10/12/2015**

Subject Name: Digital Communication

Time: 02:30pm to 05:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Draw signal space diagram for following signals. **07**
(1)BPSK (2) QPSK (3) Octal PSK (4) QAM(M=16)

(b) "Entropy will be maximum when all massages are equiprobable" prove it. **07**

Q.2 **(a)** Find Huffman code, average length, entropy and redundancy of the massage with following probabilities. **07**

M1	M2	M3	M4	M5	M6
0.30	0.25	0.15	0.12	0.10	0.08

(b) Find capacity of a band Limited AWGN Channel. **07**

OR

(b) Find Channel capacity of the Discrete Memoriless Channel. **07**

Q.3 **(a)** Explain central limit theorem. **07**

(b) A Signal amplitude x is a random variable uniformly distributed in range (-1,1).This signal is passed through an amplifier of gain 2.The output y is also a random variable, uniformly distributed in range (-2,2).Determine the differential entropies H(x) and H(y). **07**

OR

Q.3 **(a)** Explain Pulse-Code Modulation (PCM) in Detail **07**

(b) Determine the autocorrelation function $R_x(t)$ and the power P_x of a low pass random process with a white noise PSD $S_x(w)=N/2$. **07**

Q.4 **(a)** What is slope overloading and granular noise in delta modulation? How can we solve this problem? **07**

(b) For PCM with n=8, determine the output SNR for a Gaussian m(t).Assume the saturation region of operation. **07**

OR

Q.4 **(a)** Write Short note on the sampling theorem. What is aliasing effect? **07**

(b) Classify Random Processes. **07**

Q.5 **(a)** Write Short note on :convolution code **07**

(b) Enlist advantage and disadvantage of MSK over QPSK. **07**

OR

Q.5 **(a)** Compare Coherent and non-coherent detection of ASK, FSK, PSK, DPSK in terms of error probability. **07**

(b) Write short note on: Optimum Binary Receiver **07**

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