

Roll No. ....

Total No. of Pages : 2

**BT-6/JX**

**8728**

**Digital Communication**

**Paper : ECE-308 E**

Time : Three Hours]

[Maximum Marks : 100

**Note :-** Attempt **FIVE** questions in all, selecting at least **ONE** question from each of the **FOUR** Units.

**UNIT-I**

1. (a) With the help of proper waveforms, explain pulse position modulation. Also discuss its noise performance. 7
- (b) State and explain sampling theorem. Also discuss flat-top sampling and natural sampling. 7
- (c) What corrective measures are taken to combat the effect of aliasing? Explain. 6
2. (a) In context with quantization noise, derive the following expression :

$$\sigma_Q^2 = \frac{\Delta^2}{12}$$

Where  $\sigma_Q^2$  is the variance

$\Delta$  : step size of the quantizer. 10

- (b) With the help of proper block diagram, explain the operating principle of Adaptive Delta Modulator. 10

**UNIT-II**

3. (a) Draw the block schematic of the structure of an adaptive equalizer and discuss its operation. 10
- (b) What is correlative level coding? Sketch the block schematic of a generalized correlative coding scheme and explain it.

10

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Contd.



4. (a) Define matched filter and enlist its properties. 5  
(b) The probability of a bit being in error is  $10^{-3}$ . If a message consists of 10 bits, determine the probability of the message being in error. 5  
(c) Explain in brief LMS algorithm. 10

### UNIT-III

5. (a) What is orthonormal set of basis functions ? Explain. 5  
(b) Discuss the response of bank of correlators to noise input in detail. 15
6. (a) What is QPSK ? Draw the signal-space diagram of coherent QPSK system and explain it. Also show that QPSK signal has the minimum average energy. 12  
(b) Discuss the signal space diagram of MSK. 8

### UNIT-IV

7. (a) What is pseudo-noise sequence ? Discuss a typical method to generate these sequences. 10  
(b) Considering a direct sequence spread spectrum BPSK system, analyze the average probability of error for the system. 10
8. Write short technical notes on the following :
- (a) Fast Frequency Hopping  
(b) Slow Frequency Hopping  
(c) Processing gain. 7+7+6