

**Total No of Questions: [12]**

**SEAT NO. :**

**[Total No. of Pages : 2 ]**

**T.E. 2008 (Electronics Engineering)**

**DATA COMMUNICATION**

**(Semester - I)**

**Time: 3 Hours**

**Max. Marks : 100**

**Instructions to the candidates:**

- 1) Answers to the two sections should be written in separate answer books.
- 2) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section-I & Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section-II.
- 3) Answer any three questions from each section.
- 4) Neat diagrams must be drawn wherever necessary.
- 5) Figures to the right side indicate full marks.
- 6) Use of Calculator is allowed.
- 7) Assume Suitable data if necessary

**SECTION I**

Q1)	a)	List the various standard probability models. Write their PDF and CDF. Explain their significance and applications.	[8]
	b)	Derive the expression for impulse response of a Matched Filter	[8]
		OR	
Q2)	a)	Prove that mean and variance of a continuous random variable X having Uniform Distribution in interval [a, b] are, $\mu = (a + b)/2$ and $\sigma^2 = (a+b)^2/12 = (b-a)^2/12$	[8]
	b)	Compare Binomial , Poission's and Reighlay's probability Models w.r.t their PDF.	[8]
Q3)	a)	Write short notes on i) ISI ii) Eye Pattern	[8]
	b)	Draw line code formats for 10111001 for i) Unipolar RZ ii) Polar NRZ iii) Polar RZ iv) Manchester v) Differential Manchester vi) AMI vi)Polar Quaternary	[8] [8]
		OR	
Q4)	a)	Explain Spectral Features of a Line Codes with the help of Power Spectra.	[8]
	b)	Explain need of synchronizer in digital multiplexing. What is bit synchronization? Explain working of early-late bit synchronizer with neat diagram.	[8]
Q5)	a)	Explain in detail i) FEC ii) Stop and Wait iii) Go-back N	[9]

	b)	For a systematic LBC the parity check digits are C4, C5, C6 are given by C4= d1+d2+d3 C5=d1+d2 C6=d1+d3 i) Construct G ii) All Codes for the G iii) Error detection and Correction Capability iv) Prepare Suitable decoding Table v) Parity check Metrics	[9]
		OR	
Q6)	a)	Explain in detail Viterbi decoding algorithm with an example.	[9]
	b)	Explain the terms with justification i) Code rate ii) Constraint Length iii) Steady State Transition iv) Termination of Trellis	[9]
		SECTION II	
Q7)	a)	Explain variable length coding with example. How it will give compression.	[8]
	b)	A voice grade channel of the telephone network has a bandwidth of 3.4 kHz. Calculate the information capacity of the telephone channel for SNR of 30 dB.	[8]
		OR	
Q8)	a)	Prove that maximum entropy is obtained when outcomes are equiprobable.	[8]
	b)	A zero memory source emits six messages (m1, m2, m3, m4, m5, m6) with probabilities (0.30, 0.25, 0.15, 0.12, 0.10, 0.08) respectively. Find : i) Huffman code. ii) Determine its average word length. iii) Find entropy of the source. iv) Determine its efficiency and redundancy.	[8]
Q9)	a)	Draw and Explain the DPSK transmitter with the help of waveform.	[8]
	b)	Explain the generation and reception of BFSK with the help of block diagrams.	[8]
		OR	
Q10)	a)	Compare error probabilities for ASK and BFSK.	[8]
	b)	Derive an expression for error probability of BPSK.	[8]
Q11)	a)	Explain the PN sequence generator with diagram and truth table.	[9]
	b)	Explain with diagram TDMA, FDMA and CDMA.	[9]
		OR	
Q12)	a)	Explain Slotted ALOHA and CSMA.	[9]
	b)	Draw and explain the DSSS (BPSK) Transmitter and Receiver with suitable derivation?	[9]