Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

EC3CO11 Digital Communication

Programme: B.Tech. Branch/Specialisation: EC

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated.Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The sequence of operations in which PCM is done is **1**

(a) Sampling, quantizing, encoding
(b) Quantizing, encoding, sampling
(c) Quantizing, sampling, encoding
(d) None of these

ii. In Delta Modulation, the bit rate is **1**

(a) N times the sampling frequency
(b) N times the modulating frequency
(c) N times the nyquist criteria
(d) None of these

iii. For a line code, the transmission bandwidth must be **1**

(a) Maximum possible (b) As small as possible
(c) Depends on the signal (d) None of these

iv. Matched filter may be optimally used only for **1**

(a) Gaussian noise (b) Transit time noise
(c) Flicker (d) All of these

v. In DPSK technique, the technique used to encode bits is **1**

(a) AMI (b) Differential code
(c) Uni polar RZ format (d) Manchester format

vi. The data rate of QPSK is _____ of BPSK. **1**

(a) Thrice (b) Four times
(c) Twice (d) Same

P.T.O.

vii. The channel capacity according to Shannon's equation is **1**
(a) Maximum error free communication
(b) Defined for optimum system
(c) Information transmitted
(d) All of these

viii. The channel capacity is **1**
(a) The maximum information transmitted by one symbol over the channel
(b) Information contained in a signal
(c) The amplitude of the modulated signal
(d) All of these

ix. Parity check bit coding is used for **1**
(a) Error correction
(b) Error detection
(c) Error correction and detection
(d) None of these

x. Graphical representation of linear block code is known as **1**
(a) Pi graph (b) Matrix
(c) Tanner graph (d) None of these

Q.2 i. What is quantization noise? **3**
ii. Explain Delta modulation in detail with suitable block diagram. What are its limitations and how they can be overcome? **7**
OR iii. What are the various process involved in PCM? With the help of block diagram explain the working of PCM transmitter and receiver. **7**

Q.3 i. How pulse shaping reduces intersymbol interference. **3**
ii. What are Matched filters? Obtain its transfer function. **7**
OR iii. What is Eye pattern? Explain it with diagram. Also explain why equalizers are used. Give the working of equalizers. **7**

Q.4 i. Discuss concept of QPSK. **3**
ii. Explain generation and reception of BPSK system. Compare it with BFSKsystem. **7**

OR iii. Draw the block diagram of MSK transmitter and receiver. Discuss it in detail with required waveforms. **7**

Q.5 i. Define: **2**
(a) Entropy (b) Rate of Information
ii. Discuss the bandwidth to S/N trade off of a Gaussian Channel. **3**
iii. Discuss Shannon-Fano coding in detail. **5**
OR iv. Discuss Huffman coding in detail. **5**

Q.6 Write Short note on any two:
i. Cyclic Codes **5**
ii. Hamming Codes **5**
iii. Block Codes **5**

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Marking Scheme
EC3CO11 Digital Communication

Q.1	i.	The sequence of operations in which PCM is done is (a) Sampling, quantizing, encoding		**1**
	ii.	In Delta Modulation, the bit rate is (a) N times the sampling frequency		**1**
	iii.	For a line code, the transmission bandwidth must be (b) As small as possible		**1**
	iv.	Matched filter may be optimally used only for (a) Gaussian noise		**1**
	v.	In DPSK technique, the technique used to encode bits is (b) Differential code		**1**
	vi.	The data rate of QPSK is _____ of BPSK. (c) Twice		**1**
	vii.	The channel capacity according to Shannon's equation is (d) All of these		**1**
	viii.	The channel capacity is (a) The maximum information transmitted by one symbol over the channel		**1**
	ix.	Parity check bit coding is used for (b) Error detection		**1**
	x.	Graphical representation of linear block code is known as (c) Tanner graph		**1**
Q.2	i.	Quantization noise		**3**
		Definition	1 mark	
		Derivation	2 marks	
	ii.	Delta modulation block diagram	1 mark	**7**
		Delta modulation waveform with graph	3 marks	
		Limitations	2 marks	
		Limitations can be overcome	1 mark	
OR	iii.	Process involved in PCM		**7**
		Transmitter Block diagram	1 mark	
		Explanation	3 marks	
		Receiver Block diagram	1 mark	
		Explanation	2 marks	
Q.3	i.	Intersymbol interference.	1 mark	**3**
		Raised cosine	1 mark	
		Duobinary	1 mark	
	ii.	Matched filters	2 marks	**7**
		Its transfer function	5 marks	
OR	iii.	Eye pattern		**7**
		Explanation	1 mark	
		Complete labelled diagram	4 marks	
		Equalizers	1 mark	
		Working of equalizers	1 mark	
Q.4	i.	Concept of QPSK		**3**
	ii.	Generation of BPSK system	2.5 marks	**7**
		Reception of BPSK system	2.5 marks	
		Comparison with BFSK system	2 marks	
OR	iii.	Block diagram of MSK transmitter	2 marks	**7**
		Block diagram of MSK receiver	2 marks	
		Required waveforms	3 marks	
Q.5	i.	Define:		**2**
		(a) Entropy	1 mark	
		(b) Rate of Information	1 mark	
	ii.	Bandwidth to S/N trade off of a Gaussian Channel.		**3**
	iii.	Shannon-Fano coding		**5**
		Stepwise marking		
OR	iv.	Huffman coding		**5**
		Stepwise marking		
Q.6		Write Short note on any two:		
	i.	Cyclic Codes		**5**
	ii.	Hamming Codes		**5**
	iii.	Block Codes		**5**

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