

University of Mumbai

Examination 2020

Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Third Year Semester V

Course Code: ECC502 and Course Name: Digital Communication

Time: 2 hours

Max. Marks: 80

For the students: - All the Questions are compulsory and carry equal marks.

Q.1. All questions are compulsory.

1.	What does the central limit theorem state?
Option A:	if the sample size increases sampling distribution must approach normal distribution
Option B:	if the sample size decreases then the sample distribution must approach normal distribution
Option C:	if the sample size increases then the sampling distribution much approach an exponential distribution
Option D:	if the sample size decreases then the sampling distribution much approach an exponential distribution
2.	In a communication system, a process in which statistical averages and time averages are equal is called as
Option A:	Stationary
Option B:	Ergodic
Option C:	Gaussian
Option D:	Poisson
3.	If the values taken by a random variable are negative, the negative values will have
Option A:	Positive probability
Option B:	Negative Probability
Option C:	May have negative or positive probabilities
Option D:	Insufficient data
4.	The expected value of a random variable is its
Option A:	Mean
Option B:	Standard Deviation
Option C:	Mean Deviation
Option D:	Variance
5.	The value of the probability density function of random variable is ____
Option A:	Positive function
Option B:	Negative function
Option C:	Zero
Option D:	One
6.	Conditional Entropy is given by:
Option A:	$H(X/Y)$
Option B:	$H(Y/X)$
Option C:	both A & B
Option D:	$H(X,Y)$
7.	when Information increases then
Option A:	Probability also increases
Option B:	Probability has no relation with information

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Option C:	Probability remains constant
Option D:	Probability decreases
8.	Following is the channel coding method
Option A:	Shannon Fano coding
Option B:	Huffman code
Option C:	both a & b
Option D:	Convolution Code
9.	A cyclic code can be generated using
Option A:	Generator polynomial
Option B:	Tree diagram
Option C:	Trellis diagram
Option D:	Coefficient matrix
10.	Block codes are generated using
Option A:	Generator polynomial
Option B:	Generator matrix
Option C:	Generator polynomial & matrix
Option D:	Coefficient matrix
11.	The feedback shift register circuit is called as
Option A:	Multiplying circuit
Option B:	Dividing circuit
Option C:	Feedback circuit
Option D:	Shifting circuit
12.	Which distance is related to the error detection and correction capability of the code?
Option A:	Maximum distance
Option B:	Hamming distance
Option C:	Maximum & Minimum distance
Option D:	Minimum
13.	The no. of parity bits for block codes (n, k) are
Option A:	k-n
Option B:	n-k
Option C:	2n-k
Option D:	n-2k
14.	Which among the following is not example of block code
Option A:	Turbo code
Option B:	BCH code
Option C:	R-S Code
Option D:	Hamming code
15.	In O-QPSK phase shift is
Option A:	180
Option B:	45
Option C:	120
Option D:	90
16.	Minimum shift keying is similar to
Option A:	Continuous PSK
Option B:	BPSK
Option C:	BFSK
Option D:	QPSK

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17.	The spectral efficiency of FSK is
Option A:	1 bits/sec/Hz
Option B:	0.5 bits/sec/Hz
Option C:	0.25 bits/sec/Hz
Option D:	2 bits/sec/Hz
18.	QAM Is a combination of
Option A:	PSK and FSK
Option B:	ASK and FSK
Option C:	ASK and PSK
Option D:	MSK and FSK
19.	Which technique can be used for bandwidth reduction?
Option A:	BPSK
Option B:	QPSK
Option C:	M-aryFSK
Option D:	BFSK
20.	Zero forced equalizers are used for
Option A:	Reducing ISI to zero
Option B:	Sampling
Option C:	Quantization
Option D:	Modulation

Q.2. Attempt any **four** from six

20 marks

- a) Explain why digital communication is preferred over analog communication?
- b) Write a note on optimum receiver.
- c) Represent the following bit sequence, 1011101011, using i) Unipolar RZ, ii) Unipolar NRZ, iii) Bipolar NRZ, iv) AMI RZ, v) Manchester.
- d) A rate 1/3 convolutional coder with constraint length of '3' uses the generating vectors as given: $g_1 = 100$, $g_2 = 101$, $g_3 = 111$. Draw the encoder, state diagram and trellis diagram
- e) d. Differentiate between QPSK and Offset QPSK

Q.2 Attempt any **two** from three

20 marks

- a) Why MSK is called 'shaped QPSK'? explain
- b) What is ISI? Derive an expression for ISI and explain methods to overcome ISI.

State the Nyquist's condition for zero ISI.