University of Mumbai
Examination 2020

Program: **Electronics & Telecommunication Engineering**
Curriculum Scheme: Rev2016
Examination: TE Semester V
Course Code: ECC502 and Course Name: Digital Communication
Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Analog to digital conversion includes
Option A:	Sampling
Option B:	Quantization
Option C:	Sampling and Quantization
Option D:	None of these
2.	Error detecting capability is given as
Option A:	Dmin + 1
Option B:	Dmin – 1
Option C:	Dmin
Option D:	Dmin/2
3.	The technique that may be used to reduce the side band power is
Option A:	BPSK
Option B:	QPSK
Option C:	GMSK
Option D:	PSK
4.	Matched filter and correlator are two _____ techniques
Option A:	distinct, identical
Option B:	distinct, non-identical
Option C:	indistinct, identical
Option D:	indistinct, non-identical
5.	The unfiltered base band signal causes
Option A:	inter channel interference
Option B:	inter symbol interference
Option C:	Both ICI & ISI
Option D:	None of them
6.	The filtered base band signal causes
Option A:	inter channel interference
Option B:	inter symbol interference
Option C:	Both ICI & ISI
Option D:	None of them
7.	In BPSK the transmitted signal is a sinusoid of _____
Option A:	fixed phase

Option B:	fixed amplitude
Option C:	fixed phase and amplitude
Option D:	variable amplitude and phase
8.	Spectral efficiency of BASK is _____ %
Option A:	20
Option B:	25
Option C:	50
Option D:	75
9.	The bandwidth of MSK is ____ Hz, where fb is bit frequency.
Option A:	1.5fb
Option B:	fb/2
Option C:	2fb
Option D:	4fb
10.	What is the probability of getting a face card when a card is randomly drawn from a pack of 52 cards?
Option A:	4/52
Option B:	12/52
Option C:	13/52
Option D:	½
11.	If random variable X denotes count of heads occuring in an experiment when 3 coins are tossed. Find the probability of X taking value 2.
Option A:	1/8
Option B:	3/8
Option C:	½
Option D:	7/8
12.	Information theory deals with
Option A:	Amount of source
Option B:	Capacity of a channel
Option C:	Use of coding for utilizing the channel capacity
Option D:	all of the above
13.	Entropy is calculated by the formula
Option A:	$H[S] = \sum pk \log2(pk)$
Option B:	$H[S] = - \sum pk \log2(pk)$
Option C:	$H[S] = -2 \sum pk \log2(pk)$
Option D:	$H[S] = - \sum pk \log2(1/pk)$
14.	Rayleigh distribution is widely used in
Option A:	Communications - to model multiple paths of densely scattered signals while reaching a receiver
Option B:	Engineering - to check the lifetime of an object depending upon its age
Option C:	Medical Imaging - to model noise variance in magnetic resonance imaging
Option D:	All of these
15.	Property of cyclic code is/are

Option A:	Modulo 2 addition of any 2 codewords will result in a codeword
Option B:	Any cyclic shift in a codeword leads to a codeword
Option C:	both Modulo 2 addition of any 2 codewords will result in a codeword and Any cyclic shift in a codeword leads to a codeword
Option D:	none of these
16.	If two events A and B are independent of each other, then
Option A:	$P(A/B)=P(A\cap B)/P(B)$
Option B:	$P(A/B)=P(A)/P(B)$
Option C:	$P(A/B)=P(A)$
Option D:	$P(A/B)=P(B)$
17.	The blurring in eye pattern is because of
Option A:	ICI
Option B:	ISI
Option C:	Noise
Option D:	none of these
18.	Maximum change possible in phase in offset QPSK is
Option A:	45
Option B:	90
Option C:	60
Option D:	180
19.	Data bit stream to BPSK is _____ polar signal
Option A:	NRZ
Option B:	RZ
Option C:	Manchester
Option D:	none of these
20.	Continuous Phase Modulation is another name for
Option A:	MSK
Option B:	BPSK
Option C:	QPSK
Option D:	M-ary FSK

Q2	**Solve any Four out of Six** **5 marks each**
A	A rate 1/3 convolutional coder with constraint length of '3' uses the generating vectors as given : g1 = 100, g2= 101, g3=111. Draw the encoder, state diagram and trellis diagram
B	Represent the following bit sequence, 1011101011, using i) Unipolar RZ, ii) Unipolar NRZ, iii) Bipolar NRZ, iv) AMI RZ, v) Manchester
C	Write a note on optimum receiver.
D	What is Entropy of an information source? When is entropy maximum?
E	Define the following terms and give their significance (i) Mean (ii) Central moment (iii) Variance (iv) Standard deviation.
F	Differentiate between QPSK and OQPSK

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Explain with neat diagram transmitter, receiver and waveforms the BPSK modulation System. Sketch signal space diagram and PSD of BPSK.
B	A discrete memory less channel has an alphabet of six symbols, with the probabilities as 0.3, 0.25, 0.2, 0.12, 0.08, 0.05. Construct Huffman code and find entropy and average length of code.
C	Short note on QAM and Satellite communication system.