Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code and Course Name: ECC502, Digital Communication

Time: 1hour Max. Marks: 50

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

Q1.	A variable that can assume any possible value between two points is called ____________.
Option A:	Discrete random variable
Option B:	Continuous random variable
Option C:	Discrete sample space
Option D:	Random process
Q2.	In 8 QAM, each symbol consists of
Option A:	2 bits
Option B:	4 bits
Option C:	3 bits
Option D:	M bits
Q3.	For the (n, k) systematic cyclic code, how many bits are present in the syndrome at the receiver?
Option A:	k
Option B:	n
Option C:	$n - k$
Option D:	$n - k + 1$
Q4.	For a noise to be White Gaussian noise, the optimum filter is known as
Option A:	Low pass filter
Option B:	Base band filter
Option C:	Matched filter
Option D:	Bessel filter
Q5.	Determine the transfer function of a rate 1/2 convolution encoder defined by v1 = (1, 0), v2 = (1, 1).
Option A:	$D^3 + D^4 + D^5 + \ldots$
Option B:	$D + D^2 + D^3 + \ldots$
Option C:	$D^2 + D^3 + D^4 + \ldots$

Option D:	$D^3 + 2D^4 + 3D^5 + \dots$
Q6.	The Central Limit Theorem says that the sampling distribution of the sample mean is approximately normal if
Option A:	all possible samples are selected
Option B:	the sample size is large
Option C:	the standard error of the sampling distribution is small
Option D:	the standard error of the sampling distribution is large
Q7.	The SNR of the matched filter does not depend on the
Option A:	bandwidth
Option B:	quality of the signal
Option C:	gain
Option D:	signal waveform shape
Q8.	Orthonormal vectors are
Option A:	orthogonal and normal
Option B:	orthogonal but not normal
Option C:	normal but not orthogonal
Option D:	neither orthogonal nor normal
Q9.	In the Viterbi algorithm for decoding of convolution codes, which metric is used for decision making of optimum message?
Option A:	Galois field
Option B:	Hamming distance
Option C:	Hamming bound
Option D:	Parity check
Q10.	What is the theoretical minimum system bandwidth needed for a 10 Mbps signal using 16-level PAM without ISI?
Option A:	1.1 MHz,
Option B:	1.25 MHz,
Option C:	1.35 MHz,
Option D:	1.5 MHz
Q11.	In Channel coding theorem, channel capacity decides the _______________ permissible rate at which error free transmission is possible.
Option A:	Maximum
Option B:	Minimum
Option C:	Constant
Option D:	Infinity

Q12.	Determine the parity check polynomial for a (7, 4) cyclic code having the generator polynomial G(x) = $x^3 + x + 1$.
Option A:	$x^4 + x + 1$
Option B:	$x^4 + x^3 + x + 1$
Option C:	$x^4 + x^3 + 1$
Option D:	$x^4 + x^2 + x + 1$
Q13.	A and B are two events such that P(A) = 0.2, P(B) = 0.4, and P(A union B) = 0.5. What is the value of P(A|B)?
Option A:	0.10
Option B:	0.25
Option C:	0.50
Option D:	0.08
Q14.	Spectrum of BFSK may be viewed as the sum of
Option A:	Two ASK spectra
Option B:	Two PSK spectra
Option C:	Two FSK spectra
Option D:	One ASK and one FSK spectra
Q15.	Consider a (7, 4) cyclic code with the generator polynomial G(x) = $x^3 + x + 1$. Determine the syndrome polynomial for the received codeword R = 1111100.
Option A:	1
Option B:	$x + 1$
Option C:	$x^2 + x + 1$
Option D:	$x^2 + 1$
Q16.	A Gaussian channel has 1 MHz bandwidth. Calculate the maximum channel capacity if the signal power to noise spectral density ratio S/N_0 is 10^5.
Option A:	100 kbps,
Option B:	200 kbps,
Option C:	188 kbps,
Option D:	144 kbps
Q17.	Consider a 10 Mbps signal using 16-level PAM system. How large can the roll-off factor be if the allowable system bandwidth is 1.375 MHz without ISI?
Option A:	0.05
Option B:	0.1

Option C:	0.15
Option D:	0.2
Q18.	Consider a (7, 4) linear block code with the parity check matrix given by H = [1 1 1 0 1 0 0; 1 1 0 1 0 1 0; 1 0 1 1 0 0 1]. Determine the corresponding parity matrix.
Option A:	P = [1 1 1; 1 1 0; 1 0 1; 0 1 1]
Option B:	P = [1 1 1; 1 1 0; 1 0 1; 1 0 0]
Option C:	P = [1 1 0; 1 0 1; 0 1 1; 1 1 1]
Option D:	P = [1 0 0; 0 1 0; 0 0 1; 0 1 1]
Q19.	A problem in mathematics is given to three students A, B and C. If the probability of A solving the problem is 1/2 and B not solving it is 1/4. The whole probability of the problem being solved, i.e. P(A or B or C) is 63/64, then what is the probability of C solving it?
Option A:	1/8
Option B:	1/64
Option C:	7/8
Option D:	1/2
Q20.	Which of the following inequalities is used to determine the maximum SNR for the matched filter?
Option A:	Cauchy
Option B:	Cauchy-Schwarz
Option C:	Schwarz
Option D:	Euclidean
Q21.	Which of the following modulation schemes cannot be used over a non-linear channel?
Option A:	BPSK
Option B:	BFSK
Option C:	QPSK
Option D:	QAM
Q22.	In QPSK, each symbol consists of
Option A:	1 bit
Option B:	2 bits
Option C:	4 bits
Option D:	M bits
Q23.	Huffman coding technique is adopted for constructing the source code with _________ redundancy.

Option A:	Maximum
Option B:	Constant
Option C:	Minimum
Option D:	Unpredictable
Q24.	Determine the output of the duobinary encoder with precoder if the input message is 0010110.
Option A:	-2, 2, 0, -2, 0, 2
Option B:	0, -2, 2, -2, 0, 2
Option C:	-2, 0, 2, 2, -2, 2
Option D:	-2, 0, 2, 0, 0, 2
Q25.	When the output of the matched filter is sampled at ________, a proportional voltage to the received signal energy is produced for detection and post-detection.
Option A:	t = nT
Option B:	t = T
Option C:	t = n/T
Option D:	T = n/t