

3.

Q1 (20marks)	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	A simple even parity-check code can detect ----- errors.
Option A:	an even number of
Option B:	odd number of
Option C:	two
Option D:	zero
2.	For M equally likely messages, the average amount of information H is
Option A:	$H = \log_{10} M$
Option B:	$H = \log_2 M$
Option C:	$H = \log_{10} M^2$
Option D:	$H = 2\log_{10} M$
3.	The binary waveform used to generate BPSK signal is encoded in
Option A:	Bipolar NRZ format
Option B:	Manchester format
Option C:	Uni polar NRZ format
Option D:	Polar NRZ format
4.	If the bit rate for a 16-ary QASK signal is 1600 bps, the baud rate is
Option A:	100
Option B:	200
Option C:	400
Option D:	800
5.	Which among the following line codes have inherent error detection and correction capability?
Option A:	Unipolar NRZ
Option B:	Polar RZ
Option C:	Bipolar NRZ
Option D:	Unipolar RZ

4.

5.	If the channel is band limited to 6 kHz & signal to noise ratio is 16, what would be the capacity of the channel?
Option A:	15.15 kbps
Option B:	24.74 kbps
Option C:	30.12 kbps
Option D:	52.18 kbps
7.	Integrate and dump receiver is _____
Option A:	optimum receiver
Option B:	suboptimum receiver
Option C:	optimistic receiver
Option D:	correlation receiver
8.	The signal to noise ratio of the matched filter depends only upon the ratio of the signal energy to the PSD of
Option A:	White noise
Option B:	Flicker noise
Option C:	Cosmic noise
Option D:	Transit time noise
9.	In decoding of cyclic code, which among the following is also regarded as 'Syndrome Polynomial'?
Option A:	Generator Polynomial
Option B:	Received code word Polynomial
Option C:	Quotient Polynomial
Option D:	Remainder Polynomial
10.	The number of k bit shift over which a single information bit influences the encoder output is given by _____.
Option A:	Code rate
Option B:	Constraint length
Option C:	Code length
Option D:	Code weight

5.

Q2 (20marks)	Solve any Two Questions out of Three (10 marks each)
A	<p>A code is composed of dots and dashes. Assume that the dash is 3 times as long as the dot and has one-third the probability of occurrence.</p> <ol style="list-style-type: none"> Calculate the information in a dot and that in a dash. Calculate the average information in the dot-dash code. Assume that a dot lasts for 10 <u>ms</u> and that this same time interval is allowed between symbols. Calculate the average information transmission.
B	<p>One of nine possible messages Q_1 to Q_9 is transmitted with probabilities 0.05, 0.08, 0.20, 0.25, 0.06, 0.12, 0.08, 0.09 and 0.07 respectively. Calculate the average information and efficiency of the code using Shannon-Fano algorithm and Huffman coding algorithm. Comment on the results of both the algorithms.</p>
C	<p>Find even parity VRC, odd parity VRC, 3-bit HRC, 4-bit checksum and CRC using the generator polynomial $x^3 + x + 1$ for the following data sequence.</p> <p>110101100111</p>

6.



Q3 (20marks)	Solve any Two Questions out of Three (10 marks each)
A	<p>Parity bit equations of a linear block code are given below, $P_5 = d_1 + d_2 + d_3$ $P_6 = d_1 + d_3 + d_4$ $P_7 = d_1 + d_2 + d_4$</p> <p>i) Construct generator matrix. ii) Construct syndrome table. iii) Using syndrome table decode the data from following received codes a) 1100101 b) 0101011 iv) Implement the decoder.</p>
B	<p>Construct syndrome table for (15,11) cyclic code using $G(x) = x^4 + x + 1$. Decode message from following received code: a) 101011010100011 b) 001110100011000</p>
C	<p>Obtain the <u>codeword</u> for the encoder having message input 1100101 with convolution coding. The impulse response of the top adder output path in (1111) and that of the bottom adder output path in (1101). Sketch the trellis diagram for the encoder.</p>

7.



Q4 (20marks)	Solve any Two Questions out of Three (10 marks each)
A	<p>With reference to MSK system, explain the following:</p> <p>i) <u>Why</u> is MSK called shaped QPSK?</p> <p>ii) <u>For</u> the data sequence 10110001, sketch MSK and QPSK waveforms and explain the advantages of MSK over QPSK.</p>
B	<p>With reference to Offset -QPSK, explain the following:</p> <p>i) Sketch OQPSK waveform for the data sequence 01100011.</p> <p>ii) <u>Sketch</u> its PSD indicating the bandwidth.</p> <p>iii) Determine the error probability using signal constellation diagram.</p>
C	<p>Determine the impulse response and output of a matched filter for the given input $p(t)$ Where $p(t) = A, 0 \leq t \leq T$ $= \text{otherwise}$</p>

Files submitted: