

www.FirstRanker.com

www.FirstRanker.com





www.FirstRanker.com

www.FirstRanker.com

17Et

Module-2

3	a.	Identify	wheth
---	----	----------	-------

Symbols	Code A	Code B	Code C					
SI	00	1	0					
S2	01	01	100					
S3	10	001	101					
S4	11	00	111					

Table.Q3(a)

(06 Marks)

- b. Consider a Discrete Memory Source (DMS) with $S = \{X, Y, Z\}$ with $P = \{0.6, 0.2, 0.2\}$. Find the code word for the message "YXZXY" using Arithmetic code. (06 Marks)
- c. An information source produces a sequence of independent symbols having the following probabilities______

Symbol	A	В	С	D	E	F	G
Probabilities	1	1	1		1	Ι	1
	3	27	3	Q	9	27	27

Construct Binary Huffman encoding and find its efficiency.

(08 Marks)

(06 Marks)

OR

- 4 a. Write the Shannon's Encoding Algorithms.
 - b. Consider the following source with probabilities:

 $S = \{A, B, C, D, E, F\} \qquad P = \{0.4, 0.2, 0.2, 0.1, 0.08, 0.02\}$

Find the code words using Shannon-Fano algorithm and also find its efficiency. (06 Marks)c. Consider the following discrete memoryless source:

 $S = \{S0, Si, S., S3, S4\}$ $P = \{0.55, 0.15, 0.15, 0.1, 0.05\}$ Compute Huffman code by placing composite symbol as high as possible. Also find average code word length and variance of the code word. (08 Marks)

Module-3

- a. What is Joint Probability Matrix? How it is obtained from Channel Matrix and also mention properties of JPM. (06 Marks)
 - b. For the communication channel shown in Fig.Q5(b), determine Mutual Information and Information Rate if $r_s = 1000$ symbols/sec. Assume P(Xi) = 0.6 and P(X2) = 0.4.



Fig.Q5(b)

(06 Marks)

(06 Marks)

c. Discuss the Binary Erasure Channel and also prove that the capacity a Binary Erasure Channel is $C = P \cdot I_{-}$ bits/sec. (08 Marks)

OR

- 6 a. What is Mutual Information? Mention its properties.
 - b. The noise characteristics of a channel shown in Fig.Q6(b). Find the capacity of a channel if $r_s = 2000$ symbols/sec using Muroga's method.



c. State and prove the ShawwwIFarstRanker.com

(06 Marks) (08 Marks) FirstRanker.com

www.FirstRanker.com

www.FirstRanker.com

17EC54

Module-4

- a. What are the advantages and disadvantages of Error Control Coding? Discuss the methods of controlling Errors. (06 Marks)
 - b. The parity check bits of a (7, 4) Hamming code are generated by
 - $C_{s} = d_{1} + d_{3} + d_{4}$
 - $C_0 = d, +d, +d_3$
 - $C_{3} = d_{3} + d_{3} + d_{4}$

where dl, d2, d_3 and d_4 are the message bits.

(i) Find G and H for this code.

(ii) Prove that $GH^T = 0$.

- (06 Marks)
- c. Design a syndrome calculating circuit for a (7, 4) cyclic code with $g(X) = 1 + X + X^{-3}$ and also calculate the syndrome of the received vector R = 1110101. (08 Marks)

OR

8 a. For a systematic (6, 3) linear block code, the Parity Matrix P is given by

$$\begin{vmatrix} \mathbf{O} & \mathbf{I} \\ [Fs] = \mathbf{O} & \mathbf{I} & \mathbf{I} \\ \begin{vmatrix} \mathbf{I} & \mathbf{I} & \mathbf{O} \end{vmatrix}$$

- (i) Find all possible code words.
- (ii) Find error detecting and correcting capability. (06 Marks)
- b. A (7, 4) cyclic code has the generator polynomial $g(X) = 1 + X + X^{3}$. Find the code vector both in systematic and non-systematic form for the message bits (1101). (06 Marks)
- c. Draw the Encoder circuit of a cyclic code using (n K) bit shift Registers and explain it.

(08 Marks)

(04 Marks)

Module-5

- 9 a. Consider (3, 1, 2) Convolution Encoder with $g^{t} = 110$, $g^{(2)} = 101$ and $g^{(3)} = 111$.
 - (i) Draw the encoder diagram.
 - (ii) Find the code word for the message sequence (11101) using generator Matrix and Transform domain approach. (16 Marks)
 - b. Discuss the BCH codes.

OR

- 10 a. Consider the convolution encoder shown in Fig.Ql0(a).
 - (i) Write the impulse response and its polynomial.
 - (ii) Find the output corresponding to input message (10111) using time and transform domain approach.



Fig.Q10(a)

b. Write a note on Golay codes.

(16 Marks) (04 Marks)