

GUJARAT TECHNOLOGICAL UNIVERSITY**ME – SEMESTER –II-(New)-EXAMINATION – SUMMER-2019****Subject Code: 3722323****Date: 29/05/2019****Subject Name: Information Theory & Coding****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Derive the Channel Capacity for Discrete memory less channel. **07**
 (b) Prove that entropy is maximum when all cases are equi-probable with suitable example. **07**

- Q.2** (a) Use the generator polynomial $g(x) = x^3 + x^2 + 1$ to generate systematic (7,4) cyclic code for 1011, 1110, 0111, 1010. **07**
 (b) Construct Huffman code for source shown below. Find the entropy of the source, average length of the codeword, efficiency and redundancy of the code. **07**

Source	A	B	C	D	E	F
Probability	0.2	0.15	0.2	0.25	0.15	0.05

OR

- (b) Construct shannon-feno code for source shown below. Find the entropy of the source, average length of the codeword, efficiency and redundancy of the code. **07**

Source	A	B	C	D	E	F
Probability	0.25	0.2	0.2	0.15	0.15	0.05

- Q.3** (a) Write short note on Run Length Encoding technique. **07**
 (b) Differentiate Lossy and Lossless compression techniques for image processing and explain JPEG image compression technique in detail. **07**

OR

- Q.3** (a) Write short note on LZW Encoding Algorithm. **07**
 (b) Write short note on CCITT G4 2D (two dimensional) coding scheme. **07**

- Q.4** (a) Enlist various speech compression techniques, and explain any one in brief. **07**
 (b) What are the consequences of the Viterbi decoding algorithm not yielding a posteriori probabilities ? **07**

OR

- Q.4** (a) Write short note on Binary Image Compression. **07**
 (b) Write short note on H261 video encoding algorithm. **07**

- Q.5** (a) Explain symmetric key cryptography with suitable example. **07**
 (b) How cryptography is useful in digital signature. **07**

OR

- Q.5** (a) Explain asymmetric key cryptography with suitable example. **07**
 (b) Explain DES algorithm in detail. **07**
