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## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VIII • EXAMINATION – SUMMER • 2015** 

Subject Code:181602 Date:11/05/ Subject Name: Data Compression Time:10.30AM-01.00PM Total Mar Instructions:			5
		70	
	1. 2. 3.		
Q.1	(a) (b)	What is data compression? Compare lossy and lossless compression. Given an alphabet $A=\{a1,\ a2,\ a3,\ a4\}$ , find the first order entropy in the following cases: $ 1.  P(a1)=P(a2)=P(a3)=P(a4)=\frac{1}{4} $ $ 2.  P(a1)=\frac{1}{2},\ P(a2)=\frac{1}{4},\ P(a3)=P(a4)=\frac{1}{8} $ $ 3.  P(a1)=0.505,\ P(a2)=\frac{1}{4},\ P(a3)=\frac{1}{8}\ and\ P(a4)=0.12 $	07 07
Q.2	(a) (b)	Determine the minimum variance Huffman code with the given probabilities. $P(a2) = 0.4, \ P(a1) = 0.2, \ P(a3) = 0.2, \ P(a4) = 0.1, \ P(a5) = 0.1$ What is uniquely decodable code, explain? Determine whether the following codes are uniquely decodable or not. $1. \ \{0,01,11,111\}$ $2. \ \{0,01,110,111\}$ $3. \ \{0,10,110,111\}$ $4. \ \{1,10,110,111\}$	07 07
	<b>(b)</b>	OR Explain Shannon-Fano algorithm in detail taking suitable example.	07
Q.3	(a)	Draw the necessary tree for the sequence "aardy" using the update procedure of	07
Q.IC	(b)	Adaptive Huffman Coding.  Decode the following string 00000101000100001100010100100010001010  Using Adaptive Huffman Coding technique.  OR	
Q.3	(a) (b)	What is quantization? Explain the process of quantization in JPEG. How do you generate the tag value in Arithmetic Coding? Generate the tag value considering the three alphabets $A = \{a1, a2, a3\}$ with given probabilities as $P(a1)=0.7$ , $P(a2)=0.1$ and $P(a3)=0.2$	07 07
Q.4	(a) (b)	Explain using pseudo code integer arithmetic encoding algorithm.  What is Dictionary coding? Compare and construct LZ77 and LZSS algorithms.  OR	07 07
Q.4	(a) (b)	Explain using pseudo code integer arithmetic decoding algorithm. Given an initial dictionary consisting of the letters a, b, r, y, #, encode the following message using the LZW algorithm. a#bar#array#by#barrayar#bay	07 07
Q.5	(a) (b)	Explain usage of Discrete Cosine Transformation (DCT) in JPEG. Write short note on PNG.  OR	07 07
Q.5	(a) (b)	What are the various measures of performance of data compression algorithms? Explain using suitable diagram the audio compression technique.	07 07

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