Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 2640007 Date: 03-06-2014

Subject Name: Data Compression (DC2)

Time: 10:30 am - 01:00 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) Select the most appropriate answer **07**

1. The basic idea behind Huffman coding is to
    a. expand data by using fewer bits to encode more frequently occurring characters
    b. compress data by using fewer bits to encode more frequently occurring characters
    c. compress data by using more bits to encode more frequently occurring characters
    d. compress data by using fewer bits to encode fewer frequently occurring characters
2. Without losing quality, JPEG-2000 can achieve compression ratios of
    a. 2:1
    b. 20:1
    c. 200:1
    d. 2000:1
3. The best visual compression quality is achieved using
    a. Fourier transform
    b. Wavelets
    c. Dolby
    d. DCT
4. Down sampling is to make a digital image file smaller by
    a. adding pixels
    b. removing noise
    c. removing pixels
    d. adding noise
5. In a typical picture, most pixels will be
    a. very different to their neighbors
    b. equal
    c. very similar to their neighbors
    d. bright
6. Huffman coding is an encoding algorithm used for
    a. broadband systems
    b. lossless data compression
    c. lossy data compression
    d. files greater than 1 Mbit
7. The idea with wavelets is to represent a complicated function by
    a. square functions
    b. simple basic functions
    c. sinus functions
    d. lines

	(b)	**Write Full form** 1) ADPCM 2) CCITT 3) MPEG 4) PKZIP originally written by _____ 5) RLE **Define** 6) Phrase 7) Entropy	**07**
Q.2	**(a)**	A discrete source emits one of five symbols every millisecond. A source A = { v, w, x, y, z } has probabilities { 1/2, 1/4, 1/8, 1/16, 1/16 } respectively. Generate source entropy and information rate.	**07**
	(b)	1. Lossy Vs. Lossless Compression 2. Audio Compression vs. Video Compression	**07**
		OR	
	(b)	1. Statistical Modeling vs. Dictionary Based Modeling 2. Coding Vs. Modeling	**07**
Q.3	**(a)**	Explain LZ77 with suitable example.	**07**
	(b)	Draw Shannon-Fano tree based on this Symbols (A, B, C, D, E) with Frequency (15, 7, 6, 6, 5) using division table.	**07**
		OR	
Q.3	**(a)**	Explain LZ78 with suitable example.	**07**
	(b)	Write down Simple Huffman Algorithm and Draw Huffman tree based on this Symbols (A, B, C, D , E) with Frequency(15,7,6,6,5).	**07**
Q.4	**(a)**	What is Dictionary Based Compression explain with Example.	**07**
	(b)	What is Balancing Act and how it is useful in Sliding Window Compression.	**07**
		OR	
Q.4	**(a)**	Explain static and adaptive methods of Dictionary Based Compression.	**07**
	(b)	What is Sliding Windows Compression how it is useful compared to Dictionary Based Compression.	**07**
Q.5	**(a)**	Explain the concept of Quantization in Lossy Compression	**07**
	(b)	Discuss about PC-based sound.	**07**
		OR	
Q.5	**(a)**	Write a short note on Discrete Cosine Transform (DCT)	**07**
	(b)	Explain two important factors affecting the quality of reproduction of audio waveform.	**07**

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