

7E 7038

Roll No. \_\_\_\_\_

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7E7038

B.Tech. VII Semester (Main/Back) Examination, Dec. - 2015

Computer Engg.

7CS6.3A Data Compressing Techniques

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

**Instructions to Candidates:**

Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

**Unit - I**

1. a) What is data compression & Why we need it? Explain compression & reconstruction with the help of block diagram. (5)
- b) How modeling & coding are related? Explain with the help of examples. (5)
- c) Write huffman coding algorithm? What do you understand by length of huffman code and How it is defined. (6)

**OR**

1. a) Describe the steps for a test for unique decodability. Determine whether the following codes are uniquely decodable.
  - i) {0,01,11,111}
  - ii) {0,01,110,111}
  - iii) {0,10,110,111}
  - iv) {1,10,110,111}(6)

- b) A source emits letters from an alphabets  $A = \{a_1, a_2, a_3, a_4, a_5\}$  with probabilities  $p(a_1) = 0.15, p(a_2) = 0.04, p(a_3) = 0.26, p(a_4) = 0.05, p(a_5) = 0.5$ .
- Calculate the entropy of this source.
  - Find a Huffman code for this source.
  - Find the average length of code in (ii) & its redundancy. (10)

### Unit - II

- How a tag is generated in arithmetic coding? Encode & decode the following stream of characters: BACA with probabilities  $P(A) = 0.5, P(B) = P(C) = 0.25$  using arithmetic coding. (8)
  - Where we use the dictionary techniques of encoding? Explain various types of dictionary techniques. (8)

### OR

- A sequence is encoded using LZW algorithm & the initial dictionary shown in table:

Index	Entry
1	a
2	∅
3	r
4	t

The output of LZW encoder is following sequence:

3,1,4,6,8,4,2,1,2,5,10,6,11,13,6 decode the sequence (8)

- Encode & Decode the following sequence: this ∅ is ∅ t h e using Burrows-wheeler transform. (8)

### Unit - III

- What do you understand by vector quantization? Explain the procedure of vector quantization (8)

- b) Explain the linear system models with a suitable example. (8)

**OR**

3. a) What do you mean by codebook of a quantizer? What problems can be there when designing a codebook for a higher dimensional quantizer? How Linde-Buzo-Grey algorithm is helpful here. (10)
- b) Explain the concept of quantization in lossy compression with the help of an example. (6)

**Unit - IV**

4. a) Explain Adaptive DPCM encoder & decoder for audio compression? (8)
- b) What is Z-transform? Explain its types & properties. (8)

**OR**

4. a) Explain various types of delta modulation. Compare delta modulation with DPCM. (8)
- b) What is the significance of discrete cosine transform in JPEG baseline algorithm. (8)

**Unit - V**

5. a) Explain basic sub-band algorithm with suitable example (8)
- b) Explain multi-resolution analysis ? How scaling function are used in multi-resolution analysis. (8)

**OR**

5. Write short notes on the following: (16)
- a) MPEG Audio coding
- b) Applications of wavelets for image compression.