(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2714 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VII) THEORY EXAMINATION 2011-12

DATA COMPRESSION

Time : 3 Hours *Total Marks : 100*

Note :– Attempt **all** questions.

1. Attempt any **four** parts of the following : **(5×4=20)**

   (a) What do you mean by Data Compression ? Write some of the application where it is used.

   (b) What do you mean by Lossless Compression ? Compare lossless compression with lossy compression.

   (c) Differentiate between static length and variable length coding scheme. Explain with the help of an example.

   (d) What is average information ? What are the properties used in measure of average information ?

   (e) Explain Markov Model and Composite Source Models.

   (f) What do you understand by Uniquely Decodable Codes ?

2. Attempt any **four** parts of the following : **(5×4=20)**

(a) What is the limitation of Huffman Coding ? Explain by an example.

(b) Explain the update procedure of adaptive Huffman Coding algorithm with the help of a flow chart.

(c) Write down the application of Huffman Coding in Text compression and audio compression.

(d) Explain Golomb Codes and Tunstall Codes.

(e) Prove that the average codeword length $\bar{l}$ of an optimal code for a source S is greater than or equal to entropy H (S).

(f) Explain Lossless Image Compression with an example.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) What do you mean by Binary Code ? Compare Binary Code with Huffman Code.

(ii) Explain the Run-Length Coding with the help of suitable example.

(b) (i) Compare Huffman Coding and Arithmetic Coding. How a tag is generated in Arithmetic Coding ?

(ii) A sequence is encoded using LZW algorithm and the initial dictionary shown in table :

Index	*Entry*
1	a
2	b
3	r
4	t

The output of LZW encoder is the following sequence 3, 1, 4, 6, 8, 4, 2, 1, 2, 5, 10, 6, 11, 13, 6. Decode this sequence.

(c) (i) Give differences between static and adaptive dictionary coding scheme.

(ii) Write short notes on the following :

(1) Dynamic Markov Compression

(2) Graphic Interchange Format.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is Rate Distortion Theory ? Drive the rate distortion function for the :

(i) Binary Source

(ii) Gaussian Source.

(b) Describe the steps involved in Basic Algorithm for Prediction with Partial Match (PPM).

(c) What is lossy data encoding ? Write down the distortion measure criterias to check the fidelity of a reconstructed source sequence to the original one in such type of encoding techniques.

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is Quantization ? Describe the Quantization problem with the help of example in detail.

(b) What do you mean by Codebook of Quantizer ? Explain the steps of the Linde-Buzo-Gray Algorithm.

(c) What is Tree Structured Vector Quantization ? Explain the following Quantization Technique : (i) Structured Vector Quantization (ii) Pyramid Vector Quantization.