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BTECH
(SEM VIII) THEORY EXAMINATION 2023-24
DATA COMPRESSION

TIME: 3 HRS**M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.**2 x 7 = 14**

a.	Briefly explain the relationship between modeling and coding in compression techniques.
b.	Define the term "modeling" in the context of compression techniques.
c.	How is Huffman coding utilized in text compression?
d.	What does it mean to code a sequence of symbols?
e.	Define data compression and compression ratio.
f.	Define distortion criteria in the context of compression.
g.	Define a uniform quantizer in compression.

SECTION B

2. Attempt any three of the following:**7 x 3 = 21**

a.	Define lossless compression and describe how it differs from lossy compression.
b.	Discuss the properties of Huffman codes, such as prefix-free and optimal code lengths.
c.	Describe the basic algorithm of Prediction with Partial Match (PPM) in predictive coding.
d.	Define distortion criteria in the context of data compression and explain its importance.
e.	Explain how non-uniform quantization assigns different quantization levels to different parts of the input signal distribution.

SECTION C

3. Attempt any one part of the following:**7 x 1 = 7**

a.	Explain how modeling techniques such as physical models, probability models, and Markov models are used to represent data for compression.
b.	Define prefix codes and discuss their advantages in compression.

4. Attempt any one part of the following:**7 x 1 = 7**

a.	Discuss the advantages and limitations of Tunstall codes compared to other compression techniques.
b.	Discuss the principles behind Golomb and Rice coding, including quotient-remainder representation and parameterized encoding.



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DATA COMPRESSION

TIME: 3 HRS**M.MARKS: 70****5. Attempt any one part of the following:****7 x 1 = 7**

a.	Define dictionary techniques in data compression and their role in reducing redundancy.
b.	Explain the LZ77 and LZ78 approaches to data compression and their differences.

6. Attempt any one part of the following:**7 x 1 = 7**

a.	Define quantization and explain the quantization problem in data compression.
b.	Explain how different models, such as signal models and source models, are used to capture information about the data being compressed.

7. Attempt any one part of the following:**7 x 1 = 7**

a.	Describe the Linde-Buzo-Gray algorithm for vector quantization and its iterative approach to codebook generation.
b.	Define tree-structured vector quantizers and their hierarchical organization of codebooks.