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10CS/IS663

Sixth Semester B.E. Degree Examination, June/July 2016
Data Compression

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define data compression. With an example, explain the process of modeling and coding. **(06 Marks)**

b. Develop a Huffman code for the character sequence 'zigzagzip' generated by a source. Draw the Huffman tree for the code. Compute the entropy of the source, average length of the Huffman code and its redundancy. **(10 Marks)**

c. Verify if the code {0, 10, 101, 001, 110, 1110} is uniquely decodable. **(04 Marks)**

2 a. A receiver received some encoded symbols from channel that were encoded using LZW algorithm. The received symbols and initial dictionary are as given below.

Encoded symbols: 3 4 1 2 1 3 2 5 11 13 9 11.

Initial Dictionary					
Index	1	2	3	4	5
Entry	I	N	O	P	-

i) Decode the symbol sequence

ii) Reverse the decoded sequence and encode it using the same initial dictionary. **(10 Marks)**

b. Explain in detail, the coding schemes used in group – 3 facsimile apparatus. **(10 Marks)**

3 a. Define autocorrelation. Write short note on ARMA (N,M) model. **(06 Marks)**

b. Briefly explain the function of a quantizer. Show that, for every bit being included in uniform quantizer of uniformly distributed source, the signal-to-noise ratio increases by 6dB. **(10 Marks)**

c. Highlight the various distortion criterions used in lossy compression schemes. **(04 Marks)**

4 a. Explain vector quantization in detail. **(08 Marks)**

b. With necessary diagrams, explain Delta modulation. Also explain how the error developed can be avoided. **(12 Marks)**

PART – B

5 a. Find the inverse z-Transform of $F(z) = \frac{6z^2 - 9z}{z^2 - 2.5z + 1}$. **(06 Marks)**

b. How are the elements of DCT and DST matrix represented? Derive the DWHT transform matrix. **(06 Marks)**

c. Briefly explain the fundamental concept of the following in relation with Linear systems. Sealing, Time Invariance, Transfer Function, Impulse Response. **(08 Marks)**

6 a. With a neat block diagram, explain in detail the basic sub band coding algorithm. **(10 Marks)**

b. With a block diagram, explain MPEG – 2 AAC encoder. **(10 Marks)**

7 a. Explain multi-resolution analysis and scaling function with an example. **(10 Marks)**

b. With a neat diagram, explain SPIHT. **(10 Marks)**

8 a. With a neat diagram, explain H.261 video coding algorithm. **(10 Marks)**

b. Explain H.264 advanced video coding. **(10 Marks)**

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