USN ☐☐☐☐☐☐☐☐☐

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
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. Explain the two broad classes of compression algorithms, with example. **(04 Marks)**

   b. Write a short note on Markov model. With a help of a simple example, show that Markow model gives better performance than probability model with iid assumption. **(06 Marks)**

   c. A source emitted a sequence 'zigzagzip'.
      i) Compute the entropy of source
      ii) Develop an Huffman code for the sequence using minimum variance procedure.
      iii) Draw the Huffman tree.
      iv) Find the average length of the code and its redundancy.
      v) Encode the source output using the developed code. **(10 Marks)**

2 a. A source generated a text sequence 'attached and detached'.
      i) Encode the text using LZW encoding algorithm
      ii) Decode the encoded sequence. **(10 Marks)**
      Construct the initial dictionary in alphabetical order with symbols preceding alphabets.

   b. Explain 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 a uniform quantizer of uniformly distributed source, the signal – to – noise ratio increases by 6dB. **(10 Marks)**

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

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

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

PART – B

5 a. Find the inverse Z-tranform of $F(z) = \dfrac{6z^2 - 9z}{z^2 - 2.5z + 1}$. **(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 concepts of the following in relation with linear systems.
      i) Scaling   ii) Time invariance   iii) Transfer Function   iv) Impulse Response. **(08 Marks)**

6 a. With a neat block diagram, explain in detail. **(10 Marks)**

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

7 a. Explain multi resolution analysis and sealing 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 algorithms. **(10 Marks)**

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

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