Con. 5900-09. B.E. (EXTC) Sem VII (R) SP-6632

Data Compression & Encryption

(3 Hours) [Total Marks : 100

31/12/09

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of remaining **six** questions. 10.30 to 1.30

1. (a) Compare lossy and lossless compression. 5
   (b) Explain relative encoding for Fax and Telemetry. 5
   (c) Compare conventional and public key encryption. 5
   (d) Explain JPEG compression method for Image Compression. 5

2. (a) What is data compression ? Explain parameters to measure the performance of data compression techniques. 10
   (b) Encode the following input stream using with and without move to front coding and compare the average code word length for both coding methods. Assume alphabet A = (a, b, c, d, m, n, o, p). Input stream 'C' = "abcddcbamnopponm". 10

3. (a) Explain the Kraft Macmillan Inequality Criterion for variable size codes. Explain Ternary and Canonical Huffman codes. 10
   (b) What is idea behind context based PPM algorithm ? State the principle and how it can achieve saving in terms of rates. Explain PPM method for text compression. 10

4. (a) Explain the concept of static and dynamic dictionary. Show the encoding with example using LZ 77. 10
   (b) A source and its letters form an alphabet A = { a_1, a_2, a_3, a_4, a_5 } with probabilities P = { 0.15, 0.06, 0.24, 0.05, 0.5 } respectively. Calculate :— 10
      (i) Standard Huffman code.
      (ii) Minimum variance Huffman code
      (iii) Variance in both codes and compare them.
      (iv) Average length and redundancy of both the codes.
      (v) Draw the binary code tree for both the codes and also prove that they are prefix codes.

5. (a) Explain various approaches for compressing images of various types. 10
   (b) Describe the features of video compression as compared to image compression. Explain the MPEG industry standard for video compression. 10

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6. (a) Explain hybrid speech coders. In speech coding how the quality of speech can be improved by using CELP and other sinusoidal coders over LPC. **10**

(b) Explain how key management and distribution is a problem and how it is solved. Explain the various key management techniques. **10**

7. Write short notes on the following (any **two**) :— **20**

(a) RSA algorithm

(b) HMAC design objectives and structures

(c) Data Encryption Standard Algorithms.