Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B. Tech (CSE)/SEM-7/CS-704H/2011-12

2011
NETWORK APPLICATIONS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) LZ78 encoding technique is a/an

      a) statistical encoding

      b) arithmetic encoding

      c) dictionary based encoding

      d) differential encoding.

   ii) Huffman encoding is an example of

      a) arithmetic encoding

      b) repetitive character encoding

      c) substring matching encoding

      d) statistical encoding.

iii) RLE stands for

a) run length encoding

b) reaction lifting environment

c) repetitions lacking encoding

d) running linked encoding.

iv) JEPG is an example of

a) lossy compression b) lossless compression

c) delta compression d) none of these.

v) Distributed computing system are basically

a) a collection of dump terminals

b) a collection of processors in different geographical locations, having its own local memory

c) a single computer in which multiple thread runs in parallel

d) none of these.

vi) In distributed computing system different nodes in the network can communicate through

a) RAM to RAM data exchange

b) broadcasting through the network

c) kernel to kernel message passing

d) none of these.

vii) In distributed DBMS, mixed fragmentation basically means

a) joining of multiple tables

b) mixing of horizontal fragments

c) mixing of vertical fragments

d) combination of vertical & horizontal fragments.

viii) In distributed DBMS, site independent schema can be the

a) local schema

b) global schema

c) horizontally fragmented schema

d) vertically fragmented schema.

ix) In symmetric key cryptography, the encryption & decryption techniques require

a) two keys b) multiple keys

c) no key at all d) a single key.

x) In asymmetric key cryptography, the encryption technique by the sender requires

a) public key of the receiver

b) private key of the receiver

c) both public & private keys of the receiver

d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

$3 \times 5 = 15$

2. a) Compare between Statistical Modelling and Dynamic dictionary based data compression techniques ? Give one example of each of these techniques.
   b) What do you mean by Self Information ? 3 + 2
3. a) Explain the role of 'Sliding Window' (SW) and 'Look Ahead Buffer' (LAB) in LZ77 data compression technique.
   b) What do you mean by Global Schema in Distributed DBMS ?
   c) Give one example of a data compression technique, in which encoded codeword of symbols are uniquely decodable ? 2 + 2 + 1
4. What do you mean by happened before relationship and Time Stamp Protocol in Distributed Computing Systems ? Explain briefly. 3 + 2
5. a) Discuss some of the advantages of fragmentation for Distributed DBMS.
   b) State the primary copy locking protocol in distributed DBMS.
   c) State the names of two fragmentations that are combined in the 'Mixed Fragmentation' for the Distributed DBMS. 2 + 2 + 1

6. a) Discuss different types of possible network security attacks in general.

   b) What do you mean by 'Mark up Language' for 'www' ?

3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What do you mean by Source Encoding ? Explain with suitable example.

   b) Consider the following string of symbols in a message :

      ABBBCCBADDCC

   Now calculate the following :

   i) The entropy of each individual symbols in the above string message.

   ii) Entropy of the string message in bits/symbol.

   iii) Total number of bits required to represent the whole string message.

   Write all the necessary steps and make your own suitable assumptions whenever required.

   c) Consider the following set of symbols with their probability of occurrences, as mentioned in the bracket :

   A (0·5), B (0·3), C (0·1), D (0·1)

   Now calculate the output floating point number using the arithmetic coding, for the message of 'CAB'.

3 + 6 + 6

8. a) Explain FLC and 'Prefix Code' with examples.

   b) Consider the following string message as

   ABAABBCDCCAAE

      i) Perform the LZ78 encoding process stepwise for this above mentioned string message and write the corresponding dictionary tokens as encoding data for the whole message.

      ii) Perform the LZ78 decoding process stepwise, considering the LZ78 encoding data tokens for this above-mentioned string message as input.

   c) Calculate the RLE and write the encoding tokens for the message

   AAAAAADDDDD7777BBB

   Hence also find the compression ratio for this message based on the RLE. (2 + 2) + (4 + 4) + (2 + 1)

9. a) Compare between the Network Operating Systems (NOS) and Distributed Operating Systems (DOS).

   b) How are the transmitted message formats represented in case of Distributed Computing System ?

   c) Discuss the Distributed DBMS reference architecture with a suitable diagram.

d) Discuss how the data fragments are processed during 'Global Query Processing' in case of 'Distributed DBMS'.

3 + 3 + 5 + 4

10. a) Discuss the '2-PC' protocol for 'Distributed DBMS'.

b) What do you mean by the model for 'Network Security'?

c) State the differences between the following :

i) Viruses and Worms

ii) Active attack and Passive attack

iii) Interruption and Interception

iv) Horizontal fragmentation and Vertical fragmentation. 4 + 3 + (4 × 2)

11. Write short notes on any *three* of the following. 3 × 5

a) Check Pointing & Cold Restarts

b) HTTP Protocol

c) Asymmetric Key Encryption

d) Levels of Distribution Transparency for Distributed DBMS

e) Replay Attack.