26-11-8 EVE.

Exam code: 206701

Paper code: 837

~~Set A~~ (2

M Sc. Computer Science (Semester – I)
Session 2018 – 2019
Course Code: MCSL – 1111
Advanced Data Structure

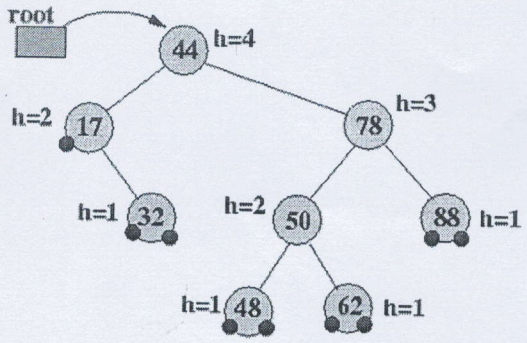
Time: 3 Hrs **M.M.: 80**

Note: Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit I

Q1: Show the Red Black Trees that results after successively inserting the keys 41, 38, 31, 12, 19, and 8 into an initially empty Red Black Tree. (Show intermediate steps)

Q2: Delete the elements 32 from a given AVL tree (show all the rotation required to delete the element i.e. 32)



Unit II

Q3: Define the heap. How a priority queue be implemented using the heap?

Q4: What is a priority queue? List and explain different ways of representing them. Also enlist at least 2 applications of priority queue.

Unit III

Q5: Given the text *T* and Pattern *P* as:

T: b b a c d c b a a b c b b a b d b a b c a a b c b c b

P: b c b b a b d b a b c

i. Use Boyer-Moore algorithm to find the pattern *P* in the text *T* showing all the intermediate steps involved.

ii. Fill the following table. **(5 + 3)**

	Total no. of shifts	Total No. of Character Comparisons	Complexity
Boyer-Moore algorithm			

Q6: Write short notes on lazy binomial queue. Perform insert and delete operations on binomial queue by taking an example.

Unit IV

Q7: a) Differentiate between external and internal sorting algorithms.

b) Write short notes on lazy binomial queue.

Q8: With example, explain modulo division and digit extraction hashing methods.

Exam Code: 206701 **Paper Code: 8380 (20)**

Programme: M. Sc. (C.Sc.) Sem-I

Course Title: Advanced Computer Architecture

Course Code: MCSL-1112

Time Allowed: 3 Hours **Max Marks: 80**

Instructions:

Candidates are required to attempt five questions in all selecting at least one question from each section. The fifth question may be attempted from any section.

Section-A

1. Explain in detail about Flynn's classification of parallel architecture. 16

2. Write notes on:
   a. SPMD
   b. Shared Memory MIMD Architecture 16

Section-B

3. Explain the concept of concurrent and parallel execution. What are basic pre-emption scheme and selection rule. 16

4. What are different types and levels of parallelism? Describe levels of available function parallelism. 16

Section-C

5. Write Short note on:
   a. Parallelism Vs Pipelining
   b. SIMD Vs MIMD

16

6. Briefly compare instruction level parallelism (ILP) to thread level parallelism (TLP). Briefly explain how ILP is achieved. 16

Section-D

7. What is pipelining? Explain in detail the hazards involved in implementing pipelining. 16

8. How Scheduling is carried out in pipeline? Show the appropriate pipeline reservation table. 16

Exam Code: 206701 Paper Code: 8381 (20)

Programme: M.Sc. (C.Sc.) Sem: I

Course Title: Network Design & Performance Analysis

Course Code: MCSL-1113

Time Allowed: 3 Hours Max Marks: 80

NOTE

Paper consists of four sections A-D. Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question is of 16 marks.

Section - A

Q 1 (a) Write a note on traffic sizing. [8 marks]
(b) What is the role of creating traffic matrix? [8 marks]

Q 2 (a) Explain the different components of design tools. [8 marks]
(b) How to choose a technology in Network Design? [8 marks]

Section - B

Q 3 (a) Write a note on designing for peaks, delay or latency. [8 marks]
(b) Explain traffic characteristics in traffic engineering. [8 marks]

Q 4 (a) How source model is useful in traffic engineering? [8 marks]
(b) Discuss the use of delay and latency in designing a network. [8 marks]

Section - C

Q 5 (a) Describe throughput and burstiness of Network. [8 marks]
(b) How o select a service provider to build a network. [8 marks]

Q 6 (a) What are various application performance needs. [8 marks]
(b) What are the business aspects of packet switching services? [8 marks]

Section - D

Q 7 (a) How to perform tuning the network [8 marks]
(b) Describe the procedure to design the backbone networks. [8 marks]

Q 8 (a) Write a note on Documentation and Network Management. [8 marks]
(b) Write a note on SNMP and RMON. [8 marks]

Exam Code: 206701 **Paper Code: 8382 (20)**

Programme : M.Sc. (C.Sc.) Sem-I

Course Title: Discrete Structures

Course Code: MCSL–1114

Time Allowed: 3 Hours **Max Marks: 80**

Note : Attempt Five questions, selecting at least one from each section.

Section A

1. (i) Prove that for sets A, B and C

$A \times (B \cap C) = (A \times B) \cap (A \times C)$ 5

(ii) In group of 12 Persons, 7 take tea, 6 take milk, 2 take neither. How many take both tea and milk? 10

(iii) For Sets A and B, prove that 5

$A \times B = B \times A \iff A = B$

2. (i) For $a,b \in Z$

We define relation R as

$a \, R \, b \iff 3/a-b$,

Prove that R is an equivalence relation.

Also find equivalence classes. 10

(ii) Using pigeonhole principle, find number of people from 100 people having same last Initials. 5

(iii) Define function. Give example of function which is onto but not one-one. 5

Section B

3 (i) State and prove Euler's formula for connected planar graphs. 10

(ii) Define Eulerian and Hamiltonian graph. Draw a graph with 6 vertices which is

(a) Hamiltonian and non-Eulerian.

(b) Eulerian and non-Hamiltonian. 10

4. (i) Define tree and prove that a tree with n vertices has n-l edges. 10

(ii) Find Chromatic number of

(a) Tree with two or more vertices.

(b) Complete bipartite graph $k_{m/n}$

(c) Complete graph K_5. 10

Section C

5 (i) Solve recurrence relation

$S_n - 45_{n-1} + 3S_{n-2} = 3^n$ 10

(ii) Using generating functions, find number of Integral solutions of

$x_1 + x_2 + x_3 + x_4 = 10$ 10

Where x_2 is even, x_1 is odd

$2 \leq x_i \leq 6$ $\forall$ i=1, 2, 3, 4

6. (i) Find number of arrangements made from letters of word MATHEMATICS. In how many of them vowels occurs together? 10

(ii) In how many ways can five questions be selected out of 10 questions when

(a) a Particular question is compulsory.

(b) No question is compulsory 10

Section D

7. (i) State and prove De-Morgan laws for Boolean algebra. 10

(ii) Explain with examples how laws of Boolean algebra is used in switching circuits. 10

8. (i) Give examples of commutative ring and non-commutative ring. 10

(ii) Prove that (z_6, t_6, x_6) is commutative ring but not an Integral domain. 10

Exam Code: 206701 **Paper Code: 8383 (20)**

Programme : M.Sc.(C.Sc.) Sem-I

Course Title: Soft Computing

Course Code: MCSL–1115

Time Allowed: 3 Hours **Max Marks: 80**

Note : Attempt five question by Selecting at least one question from each section.

Section A

1. (a) Explain the working of back propagation neural network with architecture. 8

(b) What is neural network? Explain the use of artificial neuron. 8

2. (a) Define perception. Describe perception training algorithm. 8

(b) Compare and contrast Adeline and Madeline neural networks. 8

Section B

3. (a) What is learning in neural network? Explain the concept of supervised learning with suitable examples. 8

(b) How can you recognize characters using neural networks? 8

4. (a) Write a short note on adoptive resonance theory. 8

(b) Explain the concept of bidirectional associative memory. 8

Section C

5. (a) What is meant by fuzzy sets? Discuss operations on fuzzy set. 8

(b) Explain different defuzzification methods with examples. 8

6. (a) What is fuzzy inference system? Explain different types of fuzzy inference system. 8

(b) Explain the various encoding techniques used in genetic algorithms. 8

Section D

7. (a) What is Bayes' theorem? Explain the use of Bayesian interpretation with examples. 8

(b) What is conditional probability? Explain the role of conditional probability in inference. 8

8. What do you mean by fuzzy logic? With help of examples, describe the relation of fuzzy logic with probability theory. 16