Exam Code: 223701   Paper Code: 1274

Programme: Master of Science (Computer Science)

Semester: I

Course Title: Advanced Data Structures

Course Code: MCSL-1111

Time Allowed: 3 Hours   Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

Section A

Q1: What do you mean by the term data structure? Explain various data structures in brief.   (14)

Q2: Explain Red Black tree with its properties. Also write an algorithm to delete an element from the Red Black tree with example.   (14)

Section B

Q3: Explain 2-3 and 2-3-4 trees in data structure. Write procedure to insert and delete elements from these trees.   (14)

Q4: a) Write rotations in AVL tree.   (8)

b) Explain i) Heap Sort ii) Binary Search tree   (3+3)

Section C

Q5: What is Binomial heap? Write various operations in it. (14)

Q6: Explain Accounting and Potential energy methods of Amortized analysis.   (14)

Section D

Q7: What do you mean by external sorting? How can you perform external sorting?   (14)

Q8: Write brief note on the following:

    a) Complete binary tree   b) Linked list Vs Array

    c) BFS   d) 2-3 tree

                                          (4+4+3+3)

Exam Code: 223701   Paper Code: 1275

Programme: Master of Science (Computer Science)

Semester: I

Course Title: Advanced Computer Architecture

Course Code: MCSL-1112

Time Allowed: 3 Hours   **Max Marks: 70**

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

(Section A)

Q1) Explain Kung's Taxonomy in detail.   (14)

Q2) Explain the following:-

    a) SPMD   b) Reduction Paradigm.   (7 X 2 = 14)

(Section B)

Q3) Explain the system architecture of uniprocessor computer with example.   (14)

Q4) Explain parallel processing mechanism in detail.   (14)

(Section C)

Q5) What is parallel processing? What are various trends towards parallel processing?   (14)

Q6) Explain architectural classification schemes of parallel processing with suitable examples.   (14)

(Section D)

Q7) Explain the concept of general pipelines and reservation tables.
                                                                   (14)

Q8) Explain in pipelining:-

    a) Data Buffering   b) Busing Structure

    c) Internal Forwarding   d) Register Tagging

                                                                (4+4+3+3)

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Programme: Master of Science (Computer Science)

Semester: I

Course Title: Network Security Practices

Course Code: MCSL-1113

Time Allowed: 3 Hours   Max. Marks: 70

Note:- Attempt five questions in all, selecting at least one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

Section A

Q1. Define security? Also discuss various types of attacks.

Q2. Define the key components of network security model and their rules in ensuring secure communication

Section B

Q3. Discuss RSA algorithm in detail

Q4. a. Discuss Diffy-Helmen key exchange technique

    b. Write a note on
       (i) Cast – 128 (ii) Blowfish

Section C

Q5. Write short note on
    a. Security of MAC's
    b. Types of Ciphers

Q6. What are the standards for digital signature, explain in detail

Section D

Q7. What is key management? Explain symmetric key distribution in detail.

Q8. Write short note on
    a. Transport level security
   b. Electronic mail security

Note: Attempt five questions, selecting one question from each section. The fifth question can be attempted from any section. Each question carries 14 marks.
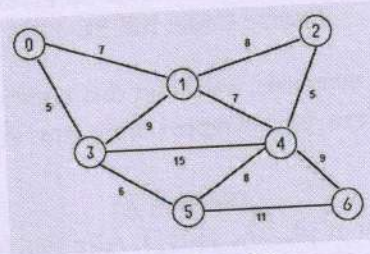
(Section A)

Q1) a) Find power set of {0, {0}, {{0}}}. Also find its cardinality.

b) Prove that $(A \cap B) \times C = (A \times C) \cap (B \times C)$

c) Explain pigeonhole principle with example.

d) Out of 500 students at a college 70 plays cricket, 85 plays football, 25 plays badminton, 10 plays both cricket and football, 6 plays both cricket and badminton, 3 plays both badminton and football. No student plays all three games. How many plays none of these games?   (4 X 3.5 = 14)

Q2) a) Give an example of relation that is symmetric and transitive.

b) Find SoR if R = {(1,1), (1,3), (2,1), (2,2), (3,1), (3,3)} and S = {(1,1), (1,3), (2,1), (2,3), (3,3), (3,4), {4,1), (4,3)}. Also find RoR⁻¹.

c) let f: Z → Z⁺ defined as f(x) = |x-1|, where x belongs to Z. Is function f bijection? Justify your answer.   (3, 8, 3)

(Section B)

Q3) a) Show that the sum of degree of all the vertices in a graph is twice the number of edges in that graph.

b) Construct a K₄ complete graph.

c) What is complete bipartite graph? How many edges will be there in an undirected complete bipartite graph K₃,₂?   (4, 4, 6)

Q4) a) What is Eulerian cycle? Does following graph has Eulerian cycle? If yes, find it otherwise state the reason.

14
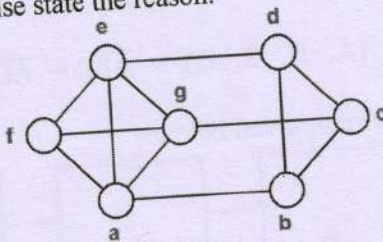
b) Find minimum cost spanning tree of following graph along with its cost.

(7 X 2 = 14)

(Section C)

Q5) a) In how many ways 6 posts can be filled in an interview with 10 candidates?

b) In how many ways, 2 blue, 4 red and 3 green balls are drawn from a black box if all the balls are to be drawn?

c) In how many ways six persons including one pair of father-son can sit around a table if they are made to sit together?

d) In how many ways can a basketball team of 5 members selected from a pool of 7 Under-19 and 5 Above-19 players if atleast 1 player from each pool is to be selected?
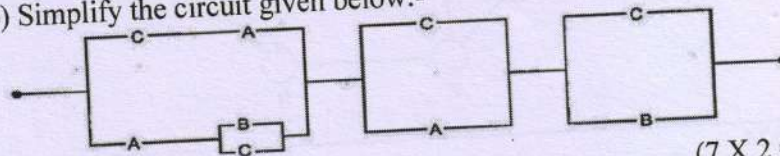
(4 X 3.5 = 14)

Q6) Solve $Q(J) + 2Q(J - 1) - 15Q(J - 2) = (-3)^J + 6.4^J$.

(14)

(Section D)

Q7) a) What is Commutative Ring? Prove that $(Z, +, .)$ is a commutative Ring with unity.

b) What is Field? What property a ring must satisfy to be declared a field?

(7 X 2 = 14)

Q8) a) Convert $F(A, B, C, D) = \overline{A}\overline{B}D + \overline{A}C\overline{D} + \overline{A}D + ABC\overline{D}$ into canonical form.

b) Simplify the circuit given below:-

(7 X 2 = 14)

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Exam Code: 223701   Paper Code: 1278
Programme: Master of Science (Computer Science)
Semester: I
Course Title: Artificial Intelligence
Course Code: MCSL-1115
Time Allowed: 3 Hours   Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question
from each section. Fifth question may be attempted from any
section. Each question carries 14 marks.

Section – I
1. What is Artificial Intelligence? What are various applications of areas of AI?   14
2. What do you mean by informed search strategy? What are various informed search strategies?   14

Section – II
3. What do you mean by game playing in Artificial Intelligence? Explain Perfect Decision Game and Imperfect decision game.
                                                               14
4. Explain Propositional logic in Artificial intelligence. What are the limitations of Propositional logic?   14

Section – III
5. Explain basic representation of plans along with its application areas and benefits. Explain the term partial order planning and conditional planning in detail.   14
6. Explain Bayes theorem in Artificial Intelligence. Also explain Bayesian Network Graph and its components   14

Section IV
7. Explain decision trees and rule based learning in detail. 14
8. Explain the following: 4+5+5
   a. Current-best-hypothesis search
   b. Re-enforcement learning
   c. Agents in AI

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