

## I Semester M.Sc. (CS) Open Book Examination, January 2021

## DISCRETE MATHEMATICS

(January 2020 Batch)

Time: 3 Hours

Max. Mark: 80

*Instruction: Answer any four questions from Part-A, answer any three questions from Part-B And answer any two questions from Part-C*

## PART – A

Answer any four questions:

(4X5=20)

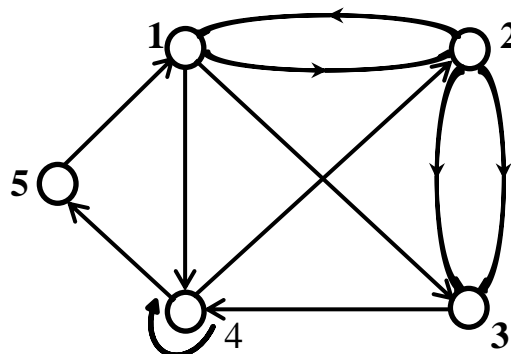
1. Show that  $(p \rightarrow q) \equiv p \wedge \sim q$
2. Find the conjunctive normal form for the formula  
 $\psi = (\sim(p \rightarrow q)) \rightarrow (q \wedge \sim r)$
3. Write a short note on Predicate.
4. Using Backtrack Method, solve  $e_n = e_{n-1} - 2, e_1 = 2$
5. Show whether the following relations are transitive:
  - (a)  $R = \{(1, 1)\}$
  - (b)  $S = \{(1, 2), (2, 2)\}$
  - (c)  $T = \{(1, 2), (2, 3), (1,3), (2, 1)\}$
6. Find the probability that among two-digit numbers formed by  $1, \dots, 5$  there is no repetition.

## PART – B

Answer any three questions:

(3X10=30)

7. Find the relation R determined by the digraph given below. Also write the matrix of the relation. Determine the in-degrees and out-degrees of the vertices.



8. Explain compatibility of a relation with example.
9. Describe Warshall's Algorithm.
10. Solve the following recurrence relations by the method of backtracking.
  - i)  $b_n = 3b_{n-1} + 1, b_1 = 7$
  - ii)  $a_n = a_{n-1} + 2n, a_1 = 5$
11. Show that the function  $f(x)=x^3$  and  $g(x)=x^{1/3}$  for  $x \in \mathbb{R}$  are inverse of each other.

### PART – C

Answer **any two** questions:

**(2X15=30)**

12. Write an algorithm to add two polynomials and explain with example.
  13. Describe the inorder, preorder and postorder algorithm to traverse a binary tree with example.
  14. Design an algorithm to sort n number using heap sort, Consider a set  $A = \{12,2,16,30,8,28,4,10,20,6,18\}$
  15. Explain Depth First Search algorithm with example.
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**I Semester M.Sc. (CS) Open Book Examination, January 2021**

**OBJECT ORIENTED PROGRAMMING WITH JAVA**

**(January 2020 Batch)**

**Time: 3 Hours**

**Max. Mark: 80**

**PART – A**

**(4X5=20)**

**Answer any four of the following questions. Each question carries five marks**

1. Discuss Java Features.
2. Explain the thread life cycle.
3. Discuss about defining packages in java.
4. What are the uses of networking?
5. Elucidate Tower of Hanoi.
6. Explain TCP/IP protocol address.

**PART – B**

**(3X10=30)**

**Answer any three of the following questions. Each question carries ten marks**

7. Explain the elementary programming concepts of java.
8. Elucidate Operators, Precedence and Associativity in detail.
9. Explain different stream class.
10. What is meant by looping? What is the significance of looping in programming?
11. Explain the working of Vector class.

**PART – C**

**(2X15=30)**

**Answer any two of the following questions. Each question carries fifteen marks**

12. Explain the necessity of Exception Handling Mechanism.
  13. Explain the applet and its architecture.
  14. Discuss the basics of the conditional statements, definition, syntax and its uses.
  15. Discuss about defining packages in java with an example.
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**I Semester M.Sc. (CS) Open Book Examination, January 2021**

**COMPUTER ARCHITECTURE**

**(January 2020 Batch)**

**Time: 3 Hours**

**Max. Mark: 80**

**Instruction:** Answer *any four* questions from Part-A, answer *any three* questions from Part-B And answer *any two* questions from Part-C

**PART – A**

Answer **any four** questions:

**(4X5=20)**

1. Describe types of computer.
2. Differentiate big-endian and little endian assignments.
3. Briefly explain logical instructions.
4. Expand PROM, EPROM and EEPROM.
5. Mention different types of secondary storage devices.
6. Write a short note on DVD.

**PART – B**

Answer **any three** questions:

**(3X10=30)**

7. Describe basic operational concepts.
8. Discuss number representation.
9. Explain briefly serial port.
10. With a neat diagram, explain the organization of a memory chip.
11. Explain design of fast adders.

**PART – C**

Answer **any two** questions:

**(2X15=30)**

12. Explain different types of addressing modes.
  13. Describe in detail accessing I/O devices.
  14. Briefly explain the different performance consideration for caching techniques.
  15. Explain Booths algorithm.
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**I Semester M.Sc. (CS) Open Book Examination, January 2021****DATA STRUCTURE****(January 2020 Batch)****Time: 3 Hours****Max. Mark: 80**

**Instruction:** Answer *any four* questions from Part-A, answer *any three* questions from Part-B And answer *any two* questions from Part-C

**PART – A**Answer **any four** questions:**(4X5=20)**

1. Write an algorithm to insert a node into a sorted singly linked list and explain.
2. What are circular linked lists? Explain with an illustrative example.
3. What are the advantages and disadvantages of doubly linked lists over singly linked lists?
4. Explain the following: a) root node      b) leaf      c) degree of a tree  
d) complete binary tree      e) tree
5. How do you represent a binary tree using adjacency matrix representation?
6. Explain binary search tree.

**PART – B**Answer **any three** questions:**(3X10=30)**

7. What is recursion? Explain with an example.
8. Describe the insertion and deletion operations on linked lists considering all possible cases.
9. Write an algorithm to sort a list of elements with selection sort method. Show the hand simulation.
10. Explain the different traversal techniques used in binary tree with example.
11. Explain linked list representation of binary tree with parental link. Give an example.

**PART – C**Answer **any two** questions:**(2X15=30)**

12. What is an algorithm? Explain with an example.
  13. What is an abstract data type? Explain with an example.
  14. Design an algorithm to convert given forest into its equivalent binary tree with atleast 3 trees and 15 nodes.
  15. How do you represent in-order threaded binary tree? Explain with algorithm.
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