

DCCA103

Reg. No.

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I Semester Degree Examination, April - 2023

COMPUTER APPLICATIONS

Data Structures

Paper : CA-C3T

(NEP Scheme)

Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

Answer any Four questions from each part.

PART - A

Answer any Four questions. Each question carries 2 marks.

(4×2=8)

1. What is Data Structure? List out its types.
2. Define : Flow (), Ceil ().
3. Define ADT.
4. What is AVL tree? Give an example.
5. Write any two difference between Binary tree and binary search tree.
6. Define any two collision Resolution methods in Hashing.

PART - B

Answer any Four questions. Each question carries 5 marks.

(4×5=20)

7. Explain Asymptotic notations.
8. Explain traversing operation in a singly linked list?
9. Write an algorithm for stack push and PoP operation and explain.
10. Write an algorithm for Pre - order traversal explain.
11. Construct a max heap for the given numbers : 13, 86, 43, 38, 54, 23, 08 and 63. Explain every step.
12. Write an algorithm for insertion sort and explain using given numbers.
56, 23, 54, 12, 66, 46, 89.

[P.T.O.]





(2)
PART - C

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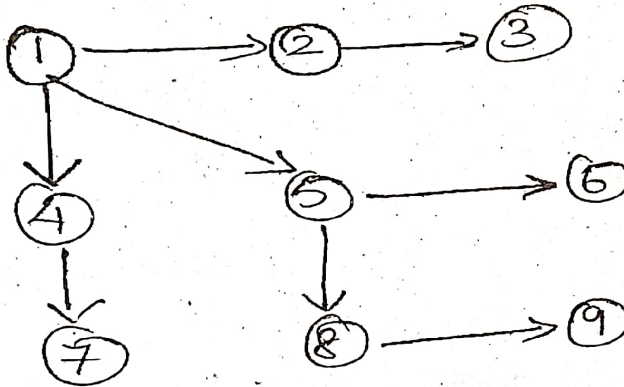
Answer any **Four** questions. Each question carries **8** marks.

(4×8=32)

13. Write an algorithm for linear search and binary search.
14. Write an algorithm to convert infix to postfix and explain by using the example below.

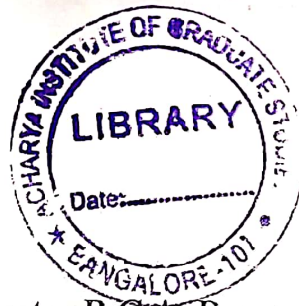
$$A + (B * C - (D / E \uparrow F) * G) * H .$$

15. a. Distinguish between linear queue and circular queue. (3)
b. Explain stack as ADT. How a stack can be represented using Arrays. (5)
16. Show the steps to sort the elements 45, 36, 15, 92, 35, 71 using bubble sort.
17. Explain stepwise BFS concept for the below graph.



18. a. Explain different ways of representing graphs. (4)
b. Explain the technique to resolve Hash collision. (4)





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I Semester B.C.A. Degree Examination, May/June - 2022

COMPUTER SCIENCE

Data Structure

(NEP Scheme 2021)

Paper : CA-C3T

Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates : Answer all Sections.

SECTION - A

- I. Answer any Four questions. Each question carries Two marks. (4×2=8)
- 1) Define Abstract Data Type.
 - 2) What is sparse matrix?
 - 3) Define Linked list.
 - 4) Define
 - a) Directed graph
 - b) Weighted graph.
 - 5) Define Binary Search.
 - 6) Define Hashing.

SECTION - B

- II Answer any Four questions. Each question carries Five marks. (4×5=20)
- 7) Explain traversal of singly linked list
 - 8) Explain circular queue with example.
 - 9) Write an algorithm for inserting values in circular queue.
 - 10) Define Binary search Tree. Give example.
 - 11) Explain Linear Search algorithm
 - 12) Explain Topological sorting.

[P.T.O.]

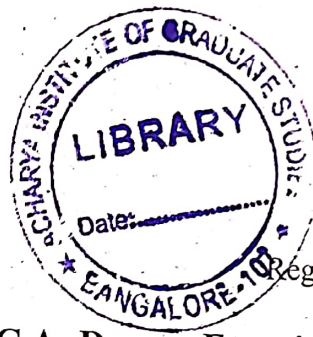




SECTION - C

- III. Answer any Four questions. Each question carries Eight marks (4×8=32)
- 13) a) Explain the different types of data Structures. (4)
b) Write a note on Asymptotic notations. (4)
- 14) a) Evaluate Postfix expression. Show step clearly 6, 5, 3, +, *, 12, 3, /, - (4)
b) Write algorithms for
i) Push
ii) Pop operations for stack (4)
- 15) What is Recursion ? Write an algorithm for tower of Hanoi Problem. (8)
- 16) Write short notes on : (8)
a) Lexicographic Search Trees
b) B - Trees.
- 17) a) Define Sorting (2)
b) Write a C Program to sort an array using insertion sort technique. (6)
- 18) Explain hashing techniques and techniques for collision resolution. (8)





DCCA101

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I Semester B.C.A. Degree Examination, April - 2023

COMPUTER APPLICATIONS

Discrete Structures

Paper : CA-CIT

(NEP 2021 Onwards Scheme)

Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

Answer any **Four** questions from each part.

PART - A

Answer any **Four** questions. Each question carries 2 marks.

(4×2=8)

1. Define power set with an example.
2. Construct the truth table for the proposition $(p \vee \sim q)$.
3. Define Equivalence Relation.

4. If $\begin{vmatrix} 1 & 2 & -1 \\ 3 & x & -2 \\ 1 & 2 & -3 \end{vmatrix} = 0$ then find x ?

5. Define pseudo graph with an example.
6. Write the planar representation of graph K_4 .

PART - B

Answer any **Four** questions. Each question carries 5 marks.

(4×5=20)

7. Show that the proposition $(p \rightarrow q) \leftrightarrow \sim p \vee q$ is a Tautology.
8. Prove by mathematical induction $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$, \forall positive integers 'n'.
9. State and prove Pigeonhole principle.

[P.T.O.]



10. Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 1 & 6 \\ 1 & 2 & 3 & 14 \\ 1 & 4 & 7 & 30 \end{bmatrix}$.

11. Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{bmatrix}$.

12. Define the following terms.

- i) Path
- ii) Circuit
- iii) Walk
- iv) Trail
- v) Loop

PART - C

Answer any **Four** questions. Each question carries **8** marks.

(4×8=32)

13. a) If $A = \{1, 3, 5, 7, 6\}$, $B = \{2, 4, 6, 1, 7\}$ and $C = \{3, 7, 11, 5\}$ verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- b) In a group of 80 people, 42 like Coffee, 60 like Tea and each person like atleast one of the two drinks. Find how many people like both Coffee and Tea? (4+4)
14. a) Let $A = \{1, 2, 3, 4, 6\}$, R is a relation on A defined by $R = \{(a, b) : a, b \in A \text{ "a divides b"}\}$ Write (i) matrix representation of R . (ii) Digraph of R .
- b) If $f: R \rightarrow R$ is defined by $f(x) = 4x + 5$ then show that f is invertible. (4+4)
15. a) Write the converse, Inverse and contrapositive of the given statement "If two integers are equal then their squares are equal".
- b) How many arrangements can be made from the letters of the word "ASSASSINATION"? In how many of these arrangements do the four S's not come together? (3+5)



16. a) If $A = \begin{bmatrix} 5 \\ 2 \\ -3 \end{bmatrix}$ and $B = [-1 \ 4 \ 6]$ show that $(AB)' = B'A'$.

b) Solve the following system of equations

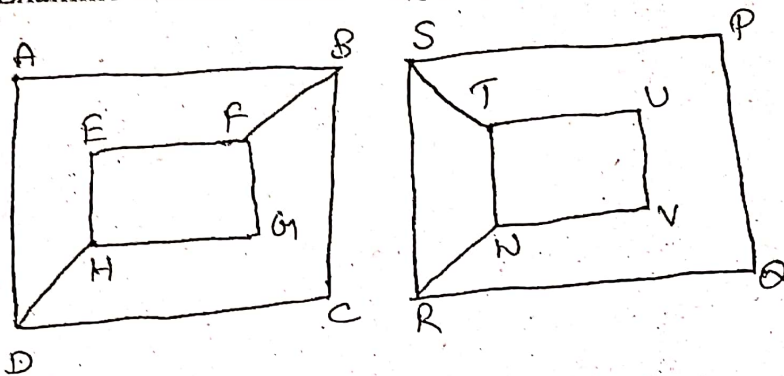
$$3x - 2y + 3z = 8$$

$$2x + y - z = 1$$

$$4x - 3y + 2z = 4$$

(3+5)

17. a) Examine whether the following graphs are Isomorphic (or) not



(6+2)

b) Define spanning tree with an example.

(8)

18. Find the minimum weight spanning tree by Prim's Algorithm.

