31272

B.C.A. II Semester Degree Examination, September/October 2023
COMPUTER APPLICATIONS
Data Structures

Time : 3 Hours   Max. Marks : 60

Instructions : 1) *Part – A :* ***All*** *questions are* ***compulsory****.*
                        2) *Part – B :* *Answer* ***any five full*** *questions.*

PART – A

I. Answer the following :   (10×1=10)

   a) Define data structure.

   b) What do you mean by linear data structure ? Give example.

   c) What is a linked list ?

   d) Define doubly linked list.

   e) Define stack.

   f) List the operations performed on stack.

   g) How do you test for an empty queue ?

   h) Mention any four applications of stack.

   i) Define depth of tree.

   j) Define binary tree.

PART – B

II. Answer **any five** of the following :   (5×10=50)

   1) a) Explain different types of data structure.   5

       b) Write an algorithm for converting infix to postfix expression.   5

   2) a) What is dequeue ? Explain its operation with example.   5

       b) Construct a max leap tree for the following numbers :

           45, 26, 10, 60, 70, 30, 40.   5

   3) a) Explain the operations performed on stack.   5

       b) Explain how do you insert an element onto a queue.   5

4) a) Explain double ended queue.   5

    b) Write a C-program to sort the given list using insertion sort technique.   5

5) a) Write a C-program to implement dynamic array, find smallest and largest element of the array.   5

    b) Write a C-program to implement linear linked list.   5

6) a) Write a C-program to find GCD using recursive function.   5

    b) Write a C-program to implement stack.   5

7) Write a note on :

    a) ADT   5

    b) Dynamic memory allocation.   5

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NEP
B.C.A. II Semester Degree Examination, September/October 2023
COMPUTER APPLICATION
Discrete Mathematical Structures

Time : 3 Hours

Max. Marks : 60

Instructions : 1) *Part – **A** : **All** questions are **compulsory**.*
2) *Part – **B** : Answer **any five** full questions.*

PART – A

I. Answer the following questions. (10×1=10)

1) What is quantifier ? Write its types.

2) Define Contrapositive.

3) Define Binomial coefficient.

4) Find the number of distinguishable words that can formed from the letter of the word "MASSASAUGA".

5) What is basic and induction step ?

6) Write a power of a set A = { a, b, c }. What is the value of $\sum_{K=4}^{n}(-1)^{K}$?

7) Define equivalent relation.

8) Define composition of relation.

9) Write difference between null graph and simple graph.

10) Define (i) Path (ii) Cycle.

PART – B

II. Answer **any five** full questions : (5×10=50)

1) a) Write a note on rules of inferences.

   b) Prove that following logical equivalence without using truth table [p∨q∨(~p∧~q∧r)] ⇔(p∨q∨r).

2) a) What is coefficient $x^{12}x^{13}$ in the expression of $(2x - 3y)^{25}$?

b) In an examination student has to answer 4 out of 6 questions in Part-A and 3 out of 5 questions in Part – B. In how many ways can she select her questions ?

3) a) Show that $1 + 3 + 5 + \ldots\ldots + (2n - 1) = n^2$.

b) Suppose $f(0) = 3 \; f(n+1) = 2f(n) + 2 \; \forall \; n \geq 0$, find $f(1), f(2), f(3)$ and $f(4)$.

4) a) Explain the properties of relation.

b) Explain computer recognized matrix relation with example.

5) a) Write difference between Euler graph and Hamilton graph with proper example.

b) Define isomorphic graph and show that G_1 and G_2 isomorphic.
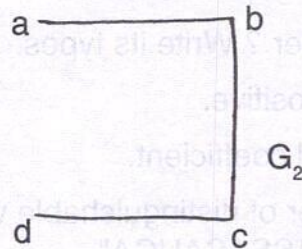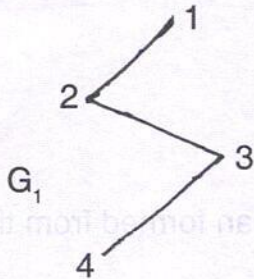
6) a) What is Matrix ? Explain types of Matrix.

b) Write a note on shortest path problem.

7) a) Write a note on divide on conquer technique.

b) What is Function ? Explain types of functions with examples.

NEP
B.C.A. II Semester Degree Examination, September/October 2023
COMPUTER APPLICATIONS
Database Management System

Time : 3 Hours   Max. Marks : 60

Instructions : 1) *Part – **A** is **compulsory**.*
2) *Answer **any five full** questions from Part – **B**.*

PART – A

Answer the following questions :   (10×1=10)

1. Define Database.

2. Define Data Models.

3. Define Entity types.

4. What are constraints in DBMS ?

5. Define SQL.

6. What is transaction processing ?

7. What are the different types of concurrency ?

8. Define normal forms.

9. Define distributed database.

10. What is Database security ?

PART – B

Answer **any five** of the following :   (5×10=50)

1. a) Write the advantages of DBMS.   5
   b) Explain Data Models.   5

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2. a) Explain relationship sets.   5

   b) What is weak entity type ? Explain the types of entity in DBMS.   5

3. a) Differentiate between Assertions and Triggers.   5

   b) Explain 1NF and 2NF.   5

4. a) What is virtual table ? Explain the types of virtual table.   5

   b) Explain multiple granularity in detail with an example.   5

5. a) Explain the types of distributed database system.   5

   b) What are the challenges of database security ?   5

6. a) Write the query for implementing MAX(), MIN(), AVG() and COUNT().   5

   b) Write the query to implement the concept of integrity constraints.   5

7. a) Write note on metadata.   5

   b) Explain relational database schemas.   5

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B.C.A. II Semester Degree Examination, September/October 2022
COMPUTER APPLICATION
Discrete Mathematical Structures

Time : 3 Hours

Max. Marks : 60

Instructions : 1) Part – **A** : **All** questions are **compulsory**.
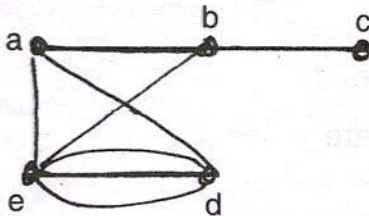2) Part – **B** : Answer **any five full** questions.

PART – A

Answer the following questions. (10×1=10)

1. Define propositional calculus.

2. What is the value of $\sum_{k=4}^{8}(-1)^k$?

3. Define divide and conquer recurrence relation.

4. Write any two uses of generating functions. *types of function Ex*

5. Define basic step and induction step.

6. Define well ordering principle.

7. Define equivalence relation.

8. Define symmetric and antisymmetric relations. *Asymmetric relation*

9. What are the degree of the vertexes in the graph ?

10. Define planar graph.

PART – B

Answer **any five full** questions : (5×10=50)

2. a) Show that $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logically equivalent. 5

b) Prove that for any propositions p, q, r, the compound proposition.

$[(p \vee q) \wedge \{(p \to r) \wedge (q \to r)\}] \to r$ is a tautology. 5

P.T.O.

3. a) Let x and y be variables and let n be a positive integer, then show that

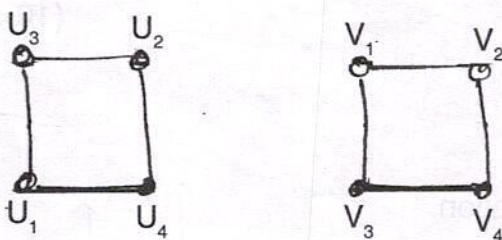$$(x+y)^n = \sum_{j=0}^{n} c(n, j)x^{n-j}y^j.$$
    5

   b) What is the coefficient of $x^{12}x^{13}$ in the expansion of $(2x - 3y)^{25}$?   5

4. a) Prove that $1 + 2 + 3 + \ldots n = \dfrac{1}{2} n (n + 1)$ by Mathematical induction.   5

   b) Prove that $1^2 + 2^2 + 3^2 + \ldots + n^2 = \dfrac{1}{6}n(n+1)(2n+1)$ for all $n \in z$.   5

5. a) Show that the graph $G = (V, E)$ and $H = (W, F)$ displayed in the following figure are isomorphic.   5

   b) Differentiate between Euler and Hamiltonian path.   5

6. a) A relation R on a set $A = \{a, b, c\}$ is represented by the following matrix.   5

$$M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

   Determine whether R is an equivalence relation.

   b) State and prove Pigeonhole principle.   5

7. a) How many integers between 1 and 300 (inclusive) are   5
      i) Divisible by atleast one of 5, 6, 8 ?
      ii) Divisible by none of 5, 6, 8 ?

   b) Define Graph coloring, cycle graph and bipartite graph with example.   5

8. a) Find the number of committees of 5 that can be formed is C(12, 5).   5

   b) How many different strings of length 4 can be formed using the letters of the FLOWER ?   5

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NEP
B.C.A. II Semester Degree Examination, Sept./Oct. 2022
COMPUTER APPLICATIONS
Data Structures (New)

Time : 3 Hours   Max. Marks : 60

Instructions : *Part – **A** : **All** questions are **compulsory**.*
*Part – **B** : Answer **any five full** questions.*

PART – A   (10×1=10)

1. Define primitive data structure.

2. What is static memory allocation ?

3. What is time complexity ?

4. Mention the types of recursion.

5. What is ADT ?

6. What is linear search ?

7. What is singly linked list ?

8. What is LIFO ?

9. What is priority queue ?

10. What is binary tree ?

PART – B   (5×10=50)

1. a) Explain tower of hanoi problem.   5
   b) Explain declaration and initialization of an array with example.   5

2. a) Write a C-program to insert an element into an existing array.   5
   b) Explain Binary search.   5

3. a) What is an array ? Explain types of an array with examples.   5
   b) Explain types of data structures.   5

P.T.O.

4. a) Explain dynamic memory allocation functions.   5

   b) Explain selection sorting technique with an example.   5

5. a) Explain circular linked list.   5

   b) Explain stack notations with examples.   5

6. a) Evaluate following postfix expression ABC – D*+E$F+ with the following
      values assigned :   5

      A = 6, B = 3, C = 2, D = 5, E = 1 and F = 7.

   b) Explain operations on simple queue.   5

7. a) Explain tree terminologies :   5
      i) node
      ii) root node
      iii) siblings
      iv) level
      v) depth.

   b) Explain preorder and inorder binary tree traversal with examples.   5

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NEP

B.C.A. II Semester Degree Examination, September/October 2022
COMPUTER APPLICATION
Database Management System (New)

Time : 3 Hours   Max. Marks : 60

Instruction : **All** Sections are **compulsory**.

SECTION – A

I. Answer **all** the following questions :   (10×1=10)

1) Define Recovery of data.

2) Define data dependency.

3) What is Data security ?

4) Write a syntax to create Table.

5) What is weak entity ?

6) What is virtual table ?

7) Define normalization.

8) Define concurrency control.

9) What are entity type ?

10) Define trigger.

SECTION – B

II. Answer **any five full** questions :   (5×10=50)

1) a) List out the different applications of database system.

   b) Explain client/server architectures of DBMS.   (5+5=10)

2) a) What is ER-diagram ? List out and describe any five notations.

   b) Explain 1ˢᵗ and 2ⁿᵈ normal forms.   (5+5=10)

3) a) What is naming convertion ? Mention the benefits of a good naming convertion.

b) Define constraint. Explain any two constraints with suitable example.

(5+5=10)

4) a) Explain desirable properties of transactions.

b) Explain ARIES recovery algorithm. **(5+5=10)**

5) a) What is log based recovery ? Explain it in detail.

b) Write an classifications of database management system. **(5+5=10)**

6) a) What is lock ? Describe the types of locks used in concurrency control.

b) Write a note on statical database security. **(5+5=10)**

7) a) What are the different challenges to maintain database security ?

b) Write any five advantages of database system. **(5+5=10)**

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OP2 ° OP1 ✓ (18)

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COMPUTER APPLICATIONS
Data Structures (New)

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Part – B : *Answer* **any five full** *questions.*

PART – A   (10×1=10)

1. Define primitive data structure.

2. What is static memory allocation ?

3. What is time complexity ?

4. Mention the types of recursion.

5. What is ADT ?

6. What is linear search ?

7. What is singly linked list ?

8. What is LIFO ?

9. What is priority queue ?

10. What is binary tree ?

PART – B   (5×10=50)

1. a) Explain tower of hanoi problem.   5

   b) Explain declaration and initialization of an array with example.   5

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    ii) root node

    iii) siblings

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    v) depth.

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Discrete Mathematical Structures

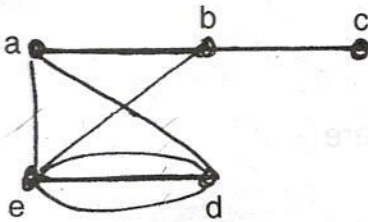Time : 3 Hours   Max. Marks : 60

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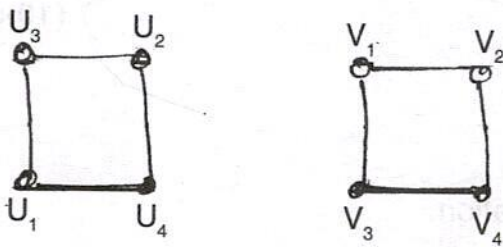3. a) Let x and y be variables and let n be a positive integer, then show that

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