1603E854

Candidate's Seat No : 10024

MCA Sem-1 (New) Examination
Obj. Oriented Concepts & Prog.
March 2022

Time : 3-00 Hours] **[Max. Marks : 50**

SECTION – I

Q-1 Attempt the following: (Any **THREE**) **[15]**

i) Describe the important concepts of Object Oriented System.
ii) Explain *cin* and *cout* with necessary figures. Explain constructor and its types with suitable example.
iii) What is inline function? List down its merits and demerits.
iv) Explain Operator overloading used in C++ in detail.

Q-2 Write a program to perform addition of values of different data types using function overloading. **[04]**

OR

Q-2 Write a program that will read m X n matrix from keyboard and perform the addition on it. **[04]**

Q-3 Differentiate the following (Any **TWO**): **[06]**

i) Data Abstraction and Encapsulation
ii) Reference Variable and Pointer variable
iii) Static data member and Static member function

SECTION – II

Q-4 Attempt the following: (Any **THREE**) **[15]**

i) What is Polymorphism? Explain dynamic Polymorphism.
ii) Explain Exception handling techniques used in C++ program in detail.
iii) Explain Class template with suitable example which needs to explain Function template used in C++.
iv) Explain merits of Binary file used in C++. Explain the functions used to read and write Binary file.

Q-5 Write short notes on followings. (Any **TWO**) **[06]**

i) Member Initialization List
ii) Inheritance and its types
iii) Manipulators

Q-6 Explain followings briefly: **[04]**

i) Pure Virtual Function
ii) Friend Function
iii) Abstract Base Class
iv) Namespace

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1903E864

Candidate's Seat No : 10029

MCA Sem-1 (New) Examination

Relational Database Mgmt. System

March 2022

Time : 3-00 Hours] **[Max. Marks : 50**

SECTION - I

Q-1 **Explain the following terms with an appropriate example:** 9

a. Inconsistent State
b. Degree of a Relationship
c. Access Path 3

Q-2 **Attempt the following :** 8

a. Discuss the Native relational operators of relational algebra with appropriate examples
b. Draw an ER diagram for the following
The online Book store allows the customer to purchase/rent books. The price of the book is mentioned along with the book details. The rent of the book depends on various factors like genre, edition, author, subject release date etc. Assume all the relevant entities and the relationship among them and draw a neat and clean ER diagram.

OR

Q-2 **Attempt the following :** 8

a. Explain Record based data Models and discuss any one in detail
b. Write Relational Algebra Queries for the following (Assume the schema)
    a. Find names of suppliers, supplying some red part for less than 100 rupees
    b. Find names of all departments that has no employees working in them
    c. Find all the suppliers who supply Red and Green boat
    d. Find all employees of sales department who are working for greater than 10 years.

Q-3 **Attempt the following** 8

a. Explain Aries Recovery Algorithm
b. Discuss Three-tier Database Architecture with appropriate Diagram

OR

Q-3 **Attempt the following** 8

a. Explain Thomas write Rule in detail
b. Explain all the Armstrong's Axioms in detail with appropriate examples

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SECTION - II

Q-4 **Explain the following Terms with an appropriate example.** 9

a. Latches and convoy
b. CLR
c. Consistency and Durability

Q-5 **Attempt the following:** 8

a. Normalize the following Structure to the best level possible 5

HappyHome supermarket deals with groceries, household items, stationary products and gift items. They have announced a summer mela where, for every customer who holds a membership with HappyHome, any three items can be taken for free. The total price of the three items should be equal to or below rs.1000. They record details of these free products given to their member customers in a table as below:

Invoice #	Membership#	Cust name	Address	Item 1	Qty	Amt	Item2	Qty	Amt	Item 3	Qty	Amt

b. Discuss the type of NoSQL Databases with appropriate example 3

OR

Q-5 **Attempt the following:** 8

a. Explain various steps of Normalization with their purpose at each level 3
b. Explain 2PL protocol in detail with example 5

Q-6 **Attempt the following :** 8

a. Explain Forward-Recovery with appropriate example
b. Define: Deadlock. What is deadlock prevention, deadlock detection and dead lock avoidance?

OR

Q-6 **Attempt the following :** 8

a. Explain Backward-Recovery with appropriate example
b. Explain Wait-Die and Wound-wait deadlock prevention technique with example.

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Candidate's Seat No : 10024

MCA Sem-1 (New) Examination

Data Structure

March 2022

Time : 3-00 Hours] **[Max. Marks : 50**

SECTION I

Q1. Give difference between (ANY four): **[08]**

i. Linear and non-linear data structure
ii. Static and dynamic memory allocation
iii. Loop and cycle
iv. Linear and binary search
v. Tree and graph
vi. Linear and circular queue

Q2. *Define linked list. How can you say it is dynamic memory allocation? For a* linear linked list write the algorithm and explain the a pproach of insertion and deletion before a given node [09]

OR

Q2. For a doubly linked list explain the method and write the algorithm of insertion and deletion at end [09]

Q3. Stack is used for reversing a string. Explain how? Write all the required algorithms . **[08]**

OR

Q3. Give advantages of circular queue over linear queue. Will the advantage be same when we use linked for implementing the queue. Write algorithm for insertion and deletion in circular queue. **[08]**

SECTION II

Q4. For given tree, find the following: **[09]**

i. Array representation
ii. Inorder,preorder and post order traversal

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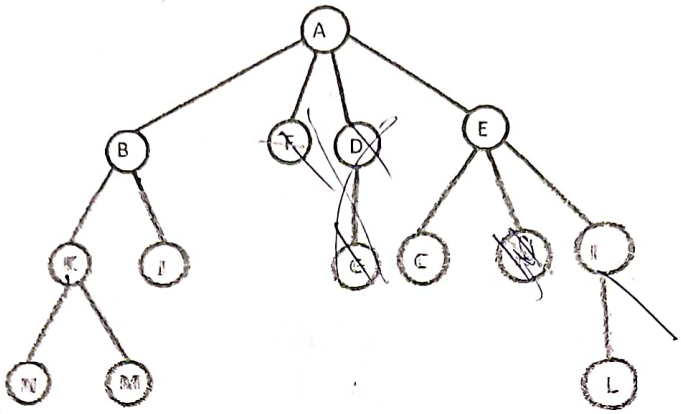
iii. Steps to delete node K



Q5. For the given expression, find expression tree and prove that inorder , preorder and postorder traversal is equal to infix , prefix and postfix expression. **[08]**

(a+b)*(c*(d+e))

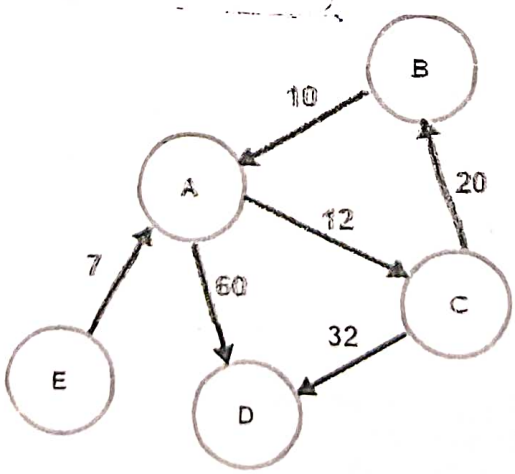
OR

Q5. For the given data construct binary search tree **[08]**

50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24

Write recursive algorithm for searching an element in binary search tree

Q6. For the given graph construct adjacency matrix and adjacency list. List applications of directed and u directed graph **[08]**



OR

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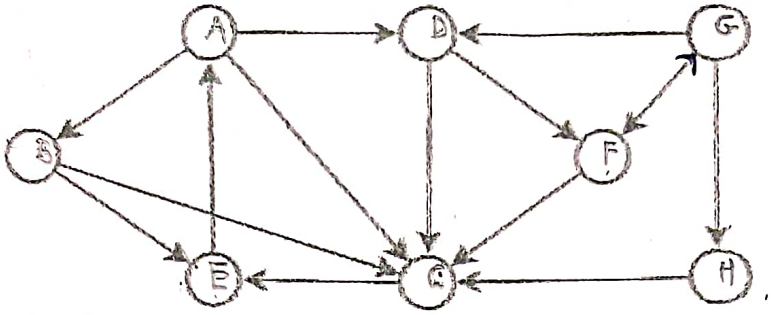
Q6. For the given graph find DFS and BFS. Use A as start **[8]**



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Candidate's Seat No : 10024

MCA Sem-1 (New) Examination

Mathematical Foundations

March 2022

Time : 3-00 Hours] **[Max. Marks : 50**

NOTE : (1) Write both the sections in the separate answer books
(2) Figures to the right indicate full marks.
(3) Make necessary assumptions wherever necessary.

SECTION-I

Q.1 **Answer the following.** **[9]**

1 In a system of linear equations, when do we say that "there exists no solution"? Explain using example.

2 If $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ be a diagonal matrix, then $\delta =$

3 If $A = \begin{bmatrix} 0 & r & -q \\ -r & 0 & p \\ q & -p & 0 \end{bmatrix}$ and $B = \begin{bmatrix} p^2 & pq & pr \\ pq & q^2 & qr \\ pr & qr & r^2 \end{bmatrix}$, then $AB =$

Q.2 (a) Find derivative of following function using first principles. (x^2 + x)^2. **[8]**

(b) Plot following functions using suitable table creation:
a. inverse of an integer
b. e^x

OR

Q.2 (a) If $M = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $M^2 - \lambda M - I_2 = O$, then $\lambda =$ **[8]**

(b) Differentiate between function and relation with appropriate example.

Q.3 **[8]**

(a) Define following terms with example with respect to graph: degree of a vertex, degree of a graph, handshaking lemma, cycle.

OR

(a) Explain adjacency matrix and adjacency list representation of a graph with example. **[8]**

SECTION-II

Q.4 **Answer the following.** **[9]**

1 Define relative error in terms of absolute error, with example

2 What is the number of significant digits in 0.00256, 0.2500, and 5.0025?

3 Show example to specify the condition when two vectors x and y are orthogonal to each other.

Q.5 (a) Explain types of numerical errors with example. **[8]**

(b) Solve the following equation using secant method x^3 + 4x^2 – 10 = 0

OR

Q.5 (a) Find solution of following set of linear equations by gauss elimination method **[8]**
2x – 3y + z = 1; X + y + z = 2; 3x – 2y + 3z = 6

(b) Differentiate between Row Echelon Form & Reduced Row Echelon Form using

P. T. O.

a suitable example.

Q.6 **[8]**

(a) Find the root of the equation ($x^2 + 5x - 5 = 0$) using Newton Raphson formula. Take the initial root as 1.

OR

(a) Solve the following set of linear equations using Cramer's rule. **[8]**

$x + y - z = 6$

$3x - 2y + z = -5$

$X + 3y - 2z = 14$

a suitable example.

Q.6 **[8]**

(a) Find the root of the equation ($x^2 + 5x - 5 = 0$) using Newton Raphson formula. Take the initial root as 1.

OR

(a) Solve the following set of linear equations using Cramer's rule. **[8]**

$x + y - z = 6$

$3x - 2y + z = -5$

$X + 3y - 2z = 14$

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2103E871

Candidate's Seat No : _____

MCA Sem-1 (New) Examination

(1) Intro. to Python. Prog.

(2) Web App. Dev.

March 2022

Time : 3-00 Hours] [Max. Marks : 50

Note : (1) Write both the sections in the separate answer books
(2) Figures to the right indicate full marks.

SECTION-I

Q1 **Attempt the following.** [9]

(a) What are the key features of Python?

(b) Explain datatypes in Python.

(c) What is function? How you can define function in python and call that function.

Q2 **Attempt the following.** [8]

(a) What do you mean by Dynamic Programming? Explain Fibonacci recursive function.

(b) Explain arbitrary keyword function in python.

OR

(a) Explain lists and mutability with list comprehension.

(b) Explain Dictionary and its methods.

Q3 **Attempt the following.** [8]

(a) How we can implement array in python?

(b) Explain lambda expression in detail.

SECTION-II

Q4 **Attempt the following.** [9]

(a) Explain the use of assert statement

(b) Explain the use of tell() and seek().

(c) Explain different modes of file.

Q5 **Attempt the following.** [8]

(a) What is exception handling? Explain different blocks available in python for handling exception.

(b) Explain different file handling function? How you can read and write in text and binary file in python?

(P.T.O)

OR

(a) What is the advantage of opening file with 'with' keyword? Also explain Pickle methods.

(b) Explain object oriented concepts: class, object, inheritance in python.

Q6 **Explain the following.(Any four)** [8]

(a) import statement

(b) mmap

(c) Turtle Graphics Object

(d) Pandas Module

(e) Matplotlib

E871-3

Jan 26

MCA – I

Subject: Web Application Development (WAD)

Time Duration: 3 Hours **Max. Marks: 50**

Instructions:

1. Write each section in separate answer sheet.
2. Numbers to the right indicate full marks of the question.
3. Make appropriate assumption whenever necessary.

SECTION – I

Q-1 Attempt the following (any five) **10**

1. What are the two differences between a class constant and static method and static property?
2. What is a jagged array? Write one example of jagged array.
3. Explain explode function with its general syntax and example.
4. What do you mean by superglobal variable? Write only name of any two superglobal variables.
5. Write only name of any four character classes used in POSIX style regular expression.
6. What will be output of the following code:

```
$value = 13.27;
$ceil = ceil($value);
echo "<br> $ceil ";
$floor = floor($value);
echo "<br> $floor ";
```

7. What is difference between require( ) and include( )? What is difference between require( ) and require_once( )?

Q-2 Attempt the following (any three) **15**

1. What are the PHP's strength? Explain any three PHP's strength compare to its competitors.
2. List and explain any five built-in methods of Exception class.
3. Explain the meaning of following for Object-Oriented concepts in PHP:
   I. class II. object III. interface IV. overriding V. polymorphism
4. Explain with example use of the functions in PHP
   i. empty ii. Isnumeric iii. Shuffle iv. Isset v. file_exists
5. What do you mean by time stamp? What is unix epoch? What date range is stored using the time stamp? What is Y2K38 problem? What is one way to solve Y2K38 problem?

P. T. O.

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SECTION - II

Q-3 **Attempt the following (any three)** **15**

1. Explain the Web Database Architecture with diagram and stages.
2. Explain subquery operator "all" with example.
3. What do you mean by cookies? What are the typical uses of cookies?
4. List and explain any five File Modes with their name and use.
5. Write only use of the following functions for PDO:
   I. query II. exec III. prepare IV. bindvalue v. II. execute

Q-4 **Attempt the follwing (any five)** **10**

1. What are the four levels of privilege available in MySQL?
2. What do you mean by anomalies? Write only name of various anomalies in a relation.
3. Write only name of any four aggregate functions of MySQL.
4. List and explain wild card characters that are typically used with like operator in Mysql?
5. Differentiate Enum and Set data type of MySQL.
6. Write only name of any four storage engines supported by MySQL.
7. Write only name of various types of Join.