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MAR-APR-2024 SUMMER EXAMINATION

B.Tech. CBCS

Sub. Name: Data Structures and Algorithms

Sub. Code: 91972

Day and Date: MAY ,09-05-2024 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions: 1. All questions are compulsory
2. Assume suitable data wherever necessary and mention it boldly
3. Draw neat labbelet diagrams wherever necessary

Special Inst.: Q.1 is compulsory.
Solve any 4 questions from remaining questions.

Q1) **Solve MCQ's (1 marks each)** **[10]**

1. The data structure required for breadth First traversal on a graph is **[1]**

a) queue b) stack c) array d) tree

2. what data structure would you mostly likely see in a non-recursive implementation of a recursive algorithm. **[1]**

a) stack b) Linked list c) Queue d) Trees

3. The time complexity of quicksort is ..... **[1]**

a. O(n) b) O(logn) c) O(n2) d) O (n logn)

4. Which of the following is not the type of queue? **[1]**

a) Ordinary queue b) Single ended queue
c) Circular queue d) Priority queue

5. Which data structure is the best for implementing a priority queue? **[1]**

a. Heap b) Array C) Linked list d) Stack

6. Which of the following are applications of linked lists? **[1]**

a) Implementing file systems b) Chaining in hast tables
c) Binary Trees implementation d) All of the above

7. In a circular queue implementation using array of size 5, the array index starts with 0 where front and rear values are 3 and 4 respectively. Determine the array index at which the insertion of the next element will take place. **[1]**

a. 5 b) 0 c) 1 d) 2

8. The data structure required for Breadth First Traversal on graph is [1]
   a) queue
   b) stack
   c) tree
   d) array

9. The optimal data structure used to solve Tower of Hanoi is---------- [1]
   a) Tree
   b) Heap
   c) Priority queue
   d) Stack

10. Which one of the following is not the application of the Queue data structure? [1]
   a) Resource shared between various systems
   b) Data is transferred asynchronously
   c) Load balancing
   d) Balancing of symbols

Q2) a) What is data structure? Explain types of data structure with example [15]
[7]
b) Define Stack? With help of suitable example, explain working of PUSH and POP operation of stack.
[8]

Q3) a) What is doubly linked list? Explain Applications of doubly linked list and Circular linked list. [15]
[7]
b) Construct algorithm for following operations on a Circular Linked List.
[8]
I. Create
II. Deleting at End
III. Counting
IV. Inserting at start

Q4) a) What is B-Tree? Explain with suitable example, insertion of a node in B-Tree? [7] [15]
b) Write C program or Pseudo code for following operations on a binary tree: [8]
i) insert a new node to the tree
ii) Pre order traversal
iii) Post order traversal

Q5) a) Explain applications of queue in detail. [7] [15]
b) b) Explain following graph Representation:

[8]

i) Adjacency Matrix

ii) Adjacency Lists

Q6) a) Write an algorithm for Merge Sort and Sort the Following number in ascending order using radix sort. 12, 8, 25, 4, 66, 2, 98, 225. **[15]**

[7]

b) Explain binary search? Choose appropriate search technique and solve search of given key elements 12, 24, 26, 28, 35, 42, 44, 60,70 key: 24 keys: 42 keys:35 [8]

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MAR-APR-2024 SUMMER EXAMINATION

B.Tech. CBCS

Sub. Name: Database Management System

Sub. Code: 91973

Day and Date: MAY ,13-05-2024 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions:

Special Inst.:
1) Q.1 is compulsory.
2) Solve any 4 questions from remaining questions.
3) Use non-programmable calculator is permissible.
4) Figures to the right indicate full marks.
5) Assume suitable data, if required.

Q1) Solve following MCQ. **[10]**

i. Which of the following refers to the number of attributes in a relation?
A. Degree
B. Row
C. Column
D. All the above

ii. Which of the following makes the transaction permanent in the database?
A. View
B. Rollback
C. Commit
D. Flashback

iii. By normalizing relations or sets of relations, one minimizes ___.
A. Data
B. Field
C. Database
D. Redundancy

iv. Which of the following generally used for performing tasks like creating structure of the relations, deleting relation?
A. TCL (Transaction Control Language)
B. DCL (Data Control Language)
C. DDL (Data Definition Language)
D. DML (Data Manipulation Language)

v. Which one of the following given statements possibly contains the error?
A. select * from emp where empid = 10003;

B. select empid from emp where empid = 10006;
C. select empid from emp;
D. select empid where empid = 1009 and Lastname = 'GELLER';

vi. The Which one of the following refers to the copies of the same data occupying the memory space at multiple places.
A. Data Repository
B. Data Redundancy
C. Data Mining
D. Data Inconsistency

vii. The ability to query data, as well as insert,delete, and alter tuples, is offered by_____
A. TCL (Transaction Control Language)
B. DCL (Data Control Language)
C. DDL (Data Definition Language)
D. DML (Data Manipulation Language)

viii. Which command is used to remove a Table from an SQL?
A. Drop table
B. Delete
C. Purge
D. Remove

ix. The key is the one in which the primary of one relation is reference another relation is called
A. Primary key
B. Foreign key
C. Candidate key
D. Concatenate key

x. Which of the following is not a property of transactions?
A. Atomicity
B. Concurrency
C. Durability
D. Isolation

Q2) Solve the following question [15]

a. Explain the following terms [7]
1. Cardinality
2. Participation

b. Define DBMS? Explain different characteristics of DBMS. [8]

Q3) Solve the following question [15]

a. Explain with proper syntax and example of DDL command in SQL. [7]

b. Define Normalization? Explain 1NF, 2NF, 3NF with example [8]

Q4) Solve the following question [15]

a. Explain Two Phase Locking Protocol for Concurrency Control. [7]

b. What is Trigger? Explain different types of triggers in SQL. [8]

Q5) Solve the following question [15]

a. What is ER Model? Explain with example of any organization. [7]

b. Consider the following table employee (Emp_id, Emp_name, Emp_age) [8]

i. Display details of employees whose age is less than 30.
ii. Display details of employees whose age is in between the range 30 to 60.
iii. Display total number of employees whose age is 60.
iv. Display names of employees whose name starts with 'S'.
v. Display details of employees whose name end with 'd'.

Q6) Solve the following question [15]

a. Define Transaction? Explain the Transaction properties. [7]

b. What is Relational algebra? Explain relational operators in details. [8]

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SHIVAJI UNIVERSITY, KOLHAPUR

S.Y B. Tech. (Electronics & Computer Science)

(Part-II) (Semester - III)

Oct. / Nov. 2023 Examination,

ENGINEERING MATHEMATICS -III

Sub. Code: 91969

Day and Date : Tuesday, 02-01-2024 **Total Marks : 70**

Time : 10.30 a.m. to 01.00 p.m.

Instructions :

1) Q.1 is compulsory.
2) Solve any 4 questions from remaining questions.
3) Use non-programmable calculator is permissible.
4) Figures to the right indicate full marks.
5) Assume suitable data, if required.

Q1 Solve MCQ's (2 marks each)

i. The complete solution of $(D^3 - 3D^2 + 3D - 1)y = 0$ _____

A) $y = (C_1 + C_2x + C_3x^2)e^x$

B) $y = C_1 + (C_2 + C_3x)e^x$

C) $y = C_1e^x + (C_2 + C_3x)e^x$

D) $y = (C_1 - C_2x)e^x + C_3e^{-2x}$

ii. The curl of vector field $f(x, y, z) = x^2 i + 2zj - yk$ is

A) $-3j$ B) $-3k$

C) $-3i$ D) 0

iii. If $A(x) = \frac{1}{x+2}$, where $x = \{1,2,3,4\}$ then scalar cardinality of A _____

A) 2.2818 B) 1.4689

C) 1.2833 D) 2.1896

fuzzy cardinality is total number of element o subset element

iv. In Fourier expansion of $f(x) = 2 - \frac{x^2}{2}; 0 \le x \le 2$ the value of constant a_0 is .....

A) $\frac{1}{2}$ B) $\frac{1}{2}$

C) $\frac{4}{3}$ D) $\frac{-4}{3}$

v. 10% of the tools produced in a certain manufacturing process turned out to be defective. Find the probabilities that out of 20 selected at random there are exactly 2 are defective.

A) 0.2345 B) 0.2020

C) 0. 2852 D) 0.1923

Q.2 a) Solve $(D^2 + D + 2)y = 1+x$ [7]

b) Solve, $(D^2 - 3D + 2)y = x^2 e^{2x}$ [8]

Q.3 a) If $\bar{a}$, $\bar{b}$ are constants and $\bar{r} = \bar{a}\cos nt + \bar{b}\sin nt$, P.T.

i) $\bar{r} X \frac{d\bar{r}}{dt} = n(\bar{a} X \bar{b})$, ii) $\frac{d^2\bar{r}}{dt^2} + n^2\bar{r} = 0$ [7]

b) Prove that $\nabla\left(\frac{\bar{r}}{r^3}\right) = 0$ [8]

Q.4 a) Find Laplace Transform of i) $t^2 \sin at$, ii) Find $L^{-1}\left[\frac{1}{s^2(s+1)}\right]$ [7]

b) Obtain half range Fourier cosine and sign series for $f(x) = e^x$ in $(0, \pi)$. [8]

Q.5 a) α-cut and strong α-cut. Find α-cut and strong α-cut for α = 0.2, 0.3, 0.4 for the Fuzzy set defined by

$C(x) = \frac{x}{x+1}, x \in \{1,2,3,4,5\}$. [7]

b) Define Fuzzy cardinality. Find the fuzzy cardinality of

$A(x) = \frac{35-x}{15}$ on X = {20,22,24,26,28,30,32,34} [8]

Q.6 a) Fit a Poisson's distribution to the following data [7]

X	0	1	2	3	4	Total
f	192	100	24	3	1	320

b) Customer accounts of a certain departmental store have an average balance Rs.120 and a standard deviation Rs.40, assuming that the distribution of account balance is normal. Find the proportion of account i) over Rs.150 ii) between Rs.100 & Rs.150 iii) between Rs.60 & Rs.90 (Given area from $z = 0$ to $z = 0.5$ is 0.1915, from $z = 0$ to $z = 0.75$ is 0.2734 and from $z=0$ to $z=1.5$ is 0.4332) [8]

ii between Rs.100 and Rs.150
between Rs.60 and Rs.90

10845

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