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R-19

Code: 19DF23T

M.C.A. II Semester Regular Examinations November 2020

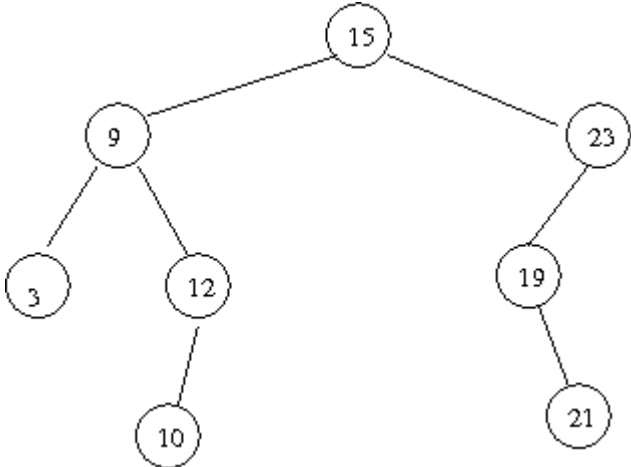
Data Structures

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

	Marks	CO	Blooms Level
1. a) Describe the reason for having different data structures to store the data. Give the classification of Data Structures.	6M	CO3	L2
b) Calculate the time complexity of a recursive algorithm for factorial of a number.	6M	CO5	L3
2. a) Compare recursive algorithms and non-recursive algorithms.	6M	CO1	L2
b) Write the benefits of modular design with appropriate examples.	6M	CO1	L2
3. Illustrate algorithms for queue data structure operations with an example.	12M	CO2	L3
4. a) Demonstrate selection sort algorithm on the following list of numbers. 14, 33, 27, 10, 35, 19, 42, 44.	6M	CO4	L3
b) Justify why merge sort is better than quick sort technique.	6M	CO4	L5
5. Write an algorithm for quick sort and apply the written algorithm to sort the following list. 54, 26, 93, 17, 77, 31, 44, 55, 20.	12M	CO4	L3
6. a) Draw a hash table with open addressing and a size of 9. Use the hash function "k%7". Insert the keys: 5, 29, 20, 0, 27 and 18 into your table (in that order).	6M	CO3	L4
b) Describe different binary tree traversals with example.	6M	CO3	L2
7. a) What is a threaded binary tree? Give the advantages of Threaded binary tree.	6M	CO4	L2
b) Describe Hashing function and collision resolution techniques.	6M	CO4	L2
8. a) In the binary search tree below, carry out the following operations in sequence: Add 5, add 17, delete 23, delete 9.			



	6M	CO3	L3
b) Write an algorithm for searching a node in B-tree and illustrate it with an example.	6M	CO4	L3

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Java Programming

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

	Marks	CO	Blooms Level
1. a) List and explain java buzz words. Identify which factors are making java a famous language.	7M	CO1	L1
b) With an example program explain the concept of classes and objects in java.	5M	CO2	L1
2. a) Justify the use of 'this' keyword in a Java program with suitable example?	5M	CO1	L5
b) Explain the usage of constructor and illustrate different types of constructors in Java.	7M	CO1	L3
3. What are the benefits of inheritance? Explain various forms of inheritance with suitable code segments.	12M	CO1	L2
4. What is method overriding? Illustrate the concepts of method overriding with an example. Is constructor overriding is possible in Java?	12M	CO1	L3
5. Define interface. Compare how interface is different form abstract class. Write a java program to implement a simple interface.	12M	CO3	L5
6. a) Differentiate between final, finally and finalize with a suitable example.	6M	CO2	L5
b) Illustrate the hierarchy of Java exception classes.	6M	CO2	L4
7. a) Implement exception handling mechanism with example.	6M	CO2	L6
b) Compare and contrast multi-threading and multitasking.	6M	CO1	L5
8. Develop a program that illustrates a multiple clients program in java.	12M	CO4	L6

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Numerical Methods

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

1. a) Find a positive real root of $x \log_{10} x = 1.2$ using Bisection Method. 6M

b) Find the smallest real root of $x^2 - \log_e x - 12 = 0$ by the method of false position. 6M

2. Derive a formula to find the cube root of N using Newton-Raphson method hence find the cube root of 15. 12M

3. a) Solve by Gauss-Elimination method,
 $3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20.$ 6M

b) Solve the following system by the method of Factorization
 $x + 3y + 8z = 4, x + 4y + 3z = -2, x + 3y + 4z = 1.$ 6M

4. a) Fit a straight line to the following data. By the method of least squares.

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

6M

b) Fit the curve $y = ae^{bx}$ to the following data.

x	0	1	2	3	4	5	6	7	8
y	20	30	52	77	135	211	326	550	1052

6M

5. The table below shows the number of absences x, in a calculus course and the final exam grade y, for 7 students. Find the correlation coefficient and interpret your result.

x	1	0	2	6	4	3	3
y	85	80	70	55	90	90	95

12M

6. The population of a town is as follows.

Year x	1941	1951	1961	1971	1981	1991
Population y	20	24	29	36	46	51

Estimate the population increase during the period 1946 to 1976. 12M

7. Using Taylor series method, find an approximate value of y at x = 0.1, 0.2 for the differential equation $y' = 2y + 3e^x, y(0) = 0.$ Compare the numerical solution obtained with exact solution. 12M

8. Given the differential equation $y' = \frac{2y}{x}$ with $y(1) = 2.$ Compute y(2) by Milne's method. Find the Starting values using Runge-Kutta method taking h=0.25. 12M

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Operations Research

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

- | | Marks | CO | Blooms Level |
|---|-------|-----|--------------|
| 1. a) What are the phases of OR? Explain. | 4M | CO1 | L1 |
| b) Write the dual of the following LPP and solve the dual problem by simplex method, hence find the primal solution.
Minimize: $Z = 6x_1 + 3x_2$
Subject to: $6x_1 - 3x_2 + x_3 = 2$
$3x_1 + 4x_2 + x_3 = 5$
and $x_1, x_2, x_3 \geq 0$ | 8M | CO1 | L3 |

2. Solve the following transportation problem for minimum total transportation cost.

		To			Supply
		CUSTOMER			
From		W	X	Y	
		SITE	A	7	
B	4		6	8	10
C	5		8	4	7
D	8		4	3	3
Demand		5	8	10	--

12M CO2 L3

3. Apply Hungarian algorithm to find the optimal assignment of salesmen to sales areas for the following cost matrix:

		Sales Area			
		A ₁	A ₂	A ₃	A ₄
Salesman	S ₁	11	17	8	16
	S ₂	9	7	12	10
	S ₃	13	16	15	12
	S ₄	14	10	12	11

12M CO2 L3

4. Apply Johnson's algorithm to find the sequence of machines that minimizes the total elapsed time (T) required for completing the following tasks. Each job is processed in the order ACB. Find 'T' also.

JOB	1	2	3	4	5	6	7
M /c -A	12	6	5	11	5	7	6
M /c -B	7	8	9	4	7	8	3
M /c -C	3	4	1	5	2	3	4

12M CO3 L3

5. Find an optimum sequence for the following sequencing problem of 4 jobs and 5 machines, when passing is not allowed, of which the processing time (in hours) is given below. Find the total elapsed time also.

JOB	A	B	C	D	E
1	7	5	2	3	9
2	6	6	4	5	10
3	5	4	5	6	8
4	8	3	3	2	6

12M CO3 L3

6. A computer contains 10,000 resistors. When any resistor fails, it is replaced. The cost of replacing a resistor individually is Re.1only. If all the resistors are replaced at the same time, the cost per resistor would be reduced to 35 paise. The percent surviving $S(t)$ at the end of month t is given below:

t	0	1	2	3	4	5	6
S(t)	100	97	90	70	32	15	0

What is the optimum replacement plan?

12M CO4 L3

7. a) Define payoff matrix and explain the minimax criterion.
 b) Solve the following game of two players (A&B) by graphical method

6M CO4 L1

	B1	B2	B3	B4
A1	4	-2	3	-1
A2	- 1	2	0	1

6M CO4 L3

8. a) Derive an expression for optimum order quantity for basic inventory model.
 b) The daily demand for a commodity is approximately 100 units. Every time an ordered is placed, a fixed cost of Rs. 100/- is incurred. The daily holding cost per unit inventory is Rs. 0.02. If the lead time is 12 days, determine the economic lot size, minimum cost, and reorder point.

6M CO5 L2

6M CO5 L3

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Organization Structure & Personnel Management

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

	Marks	CO	Blooms Level
1. a) It is well known maxim that leadership is what a leader shows. What according to you is leadership?	6M	CO1	L5
b) Which do you think to be more conducive for the development of your organization Theory X or Theory Y and why?	6M	CO1	L5
2. a) What are the policies involved in making a good decision?	6M	CO2	L1
b) Elucidate the tasks performed by personnel manager as line manager and staff manager?	6M	CO2	L2
3. a) Examine the Evolution of personnel management.	6M	CO2	L3
b) Compare and Contrast Personnel Management v/s Human Resource Management.	6M	CO2	L2
4. a) Classify different methods of recruiting employees.	6M	CO3	L4
b) Do you think reskilling can prove to be beneficial to both the organisation and the employees?	6M	CO3	L3
5. a) Discuss the objectives of training and development.	6M	CO3	L2
b) Outline the policies adopted by the organizations in transfers and promotions.	6M	CO3	L4
6. a) Illustrate are the key concepts of transactional analysis?	6M	CO4	L3
b) Define perception. Analyze the process of perception in an organization.	6M	CO4	L4
7. a) Explain bench marking process.	6M	CO5	L1
b) Give the Basic Concepts of Total Quality Management.	6M	CO5	L2
8. a) Discuss the steps in Business Process Reengineering with suitable Examples.	6M	CO5	L2
b) What are the main features and perspectives of a Balanced Scorecard?	6M	CO5	L1

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M.C.A. II Semester Regular Examinations July 2020

Database Management Systems

Max. Marks: 60

Time: 3 Hours

Answer any five questions from the following (5 x 12 = 60 Marks)

	Marks	CO	Blooms Level
1. a) Differentiate between Data and Information	5M	CO1	L2
b) Define the following terms i) Data Model ii) Scheme iii) instance IV) Canned transaction	7M	CO1	L1
2. a) What is generalization and specialization in database?	6M	CO1	L1
b) What are the responsibilities of the DBA and the database designers?	6M	CO1	L2
3. Consider the following Schema Customer(cust_name, street, city) Branch(Branch_name, Branch_city) Account(Account_number, branch_name, Balance) Loan(Loan_number, Branch_name, amount) Borrower(cust_name, Loan_number) Depositor(Cust_name, Account_number)			
and answer the below queries using tuple relational calculus			
i. Find the loan number, branch, amount of loans of greater than or equal to 10000 amount.			
ii. Find the loan number of each loan of an amount greater or equal to 10000			
iii. Find the names of all customers who have a loan and an account at the bank.			
iv. Find the names of all customers having a loan at the "ABC" branch.	12M	CO2	L2
4. Write SQL statements for following: Student(Enrno, name, courseId, emailId, cellno) Course(courseId, course_nm, duration) i) Add a column city in student table. ii) Find out list of students who have enrolled in "computer" course. iii) List name of all courses with their duration. iv) List name of all students start with 'a'. v) List emailId and cellno of all mechanical engineering students.	12M	CO3	L2
5. a) What is Functional Dependency? Explain its use in database design	6M	CO3	L1
b) Normalize following relation up to 3NF Bank (acno, cust_name, ac_type, bal, int_rate, cust_city, branchId, branch_nm, br_city)	6M	CO3	L2
6. a) Discuss the desirable properties of transaction.	5M	CO4	L3
b) Explain how shadow paging helps to recover from transaction failure.	7M	CO4	L1
7. a) Explain Log-Based Recovery in detail.	6M	CO4	L1
b) Why Concurrency control is needed? Demonstrate with example.	6M	CO4	L3
8. a) What is dynamic hashing? Give the implementation details of it.	6M	CO5	L1
b) Is B+ tree, a multi-level indexing? How does it differ from B-tree?	6M	CO5	L2
