24MCAH101 Reg No : .....

CHOICE BASED CREDIT SYSTEM

MASTER OF COMPUTER APPLICATIONS FIRST SEMESTER DEGREE EXAMINATION MAY 2025

Software Engineering

Duration:3 Hours Max Marks:70

Part A

I. Answer any THREE of the following : 3×4= 12

1. Discuss the four main attributes of a good software.
2. Summarize the benefits of sprint cycle in scrum approach for using it in iterative approach
3. Compare and contrast the difference between system context models and interaction models.
4. Analyse the three different types of software maintenance

Part B

II. Answer any FOUR of the following : 4×7= 28

5. Summarize the importance of Prototype Development in adapting to software changes
6. Explain the importance of class diagram in structural model with suitable example.
7. Explain the steps involved in requirement elicitation and analysis process.
8. Analyse the issues faced during host target development.
9. Summarize that software testing is expensive and time consuming in software development process

Part C

III. Answer any THREE of the following : 3×10= 30

10. Illustrate two approaches of interaction model using mental health care patient management system.
11. Evaluate the working of incremental development model with a neat diagram, Discuss the advantages and disadvantages over other software process models.
12. Explain the key principles and practices of Extreme Programming (XP), and how do they contribute to the success of an agile project?
13. Explain the aim of project plans and also outline the sections that are normally included in the plans.

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22MCAH102 (R) Reg No : .....

CHOICE BASED CREDIT SYSTEM

MCA NA SEMESTER DEGREE EXAMINATION MAY 2025

MASTER OF COMPUTER APPLICATIONS

Advanced Database Management Systems

Duration:3 Hours **Max Marks:70**

Part A

I. Answer any THREE of the following : 3×4= 12

1. Explain the advantages of DBMS over File systems.
2. Illustrate the concept of reference types in ORDBMS.
3. Illustrate the building blocks of XML.
4. Compare and contrast the concepts of Phrase queries and Wild card queries in IR systems.

Part B

II. Answer any FOUR of the following : 4×7= 28

5. Justify how you can work with reference types in Oracle with an example.
6. Explain the various types of architectures of Distributed DBMS.
7. Explain the different categories of Distributed Databases.
8. Justify the statement - "Deductive databases are called Logic Databases".
9. Illustrate the concept of stemming and stop words removal in text preprocessing.

Part C

III. Answer any THREE of the following : 3×10= 30

10. Illustrate the working of functions and procedures in PL/SQL.
11. Demonstrate the working model of Active Databases with suitable example.
12. Explain the various distributed commit protocols in DDBMS and make a compartive study of the two.
13. Explain the various retrieval models used in IR.

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24MCAH103 Reg No : .....

CHOICE BASED CREDIT SYSTEM

MASTER OF COMPUTER APPLICATIONS FIRST SEMESTER DEGREE EXAMINATION MAY 2025

Data Structures and Algorithms

Duration:3 Hours **Max Marks:70**

Part A

I. Answer any THREE of the following : **3×4= 12**

1. List the advantages and disadvantages of using a linked list compared to other data structures?
2. Convert the infix expression A + B * C - D / E into postfix expression.
3. Define a minimum spanning tree. Describe the steps of Kruskal's algorithm to find the minimum spanning tree of a graph.
4. Compare and contrast between quick sort and merge sort.

Part B

II. Answer any FOUR of the following : **4×7= 28**

5. How does AVL tree differ from other types of self-balancing binary search trees? Explain the concept of balance factor and how it is used to maintain the balance of the tree.
6. Design an algorithm to insert an element into the circular queue data structure.
7. Explain Splay tree. Prepare Splay tree for the following sequence of numbers: 15,10,12,20,30,25
8. Explain how Depth First search works with an algorithm and an example.
9. What is the Divide and Conquer paradigm, and how does it relate to Merge Sort? Explain it with algorithm.

Part C

III. Answer any THREE of the following : **3×10= 30**

10. Consider a linear probing hash table of size 12 with the hash function h(x) = x mod 12. Suppose we insert the keys 18, 41, 22, 35, 44, 59, and 63 in that order. What is the resulting hash table after all the insertions? How many collisions occur during the insertion process? If we now search for the key 22 in the table, how many probes are required to find it?

11. Explain the push and pop algorithm used in a stack data structure. Provide any two examples of stack data structure used in real-world applications.

12. Define number of edges in a tree with example. Write the code fragment to delete a right parent left child leaf node and right parent right child leaf node.

13. Explain how insertion sort works with an algorithm and an example. Give the best case and worst case time complexity of insertion sort.

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24MCAH104 Reg No : .....

CHOICE BASED CREDIT SYSTEM

MASTER OF COMPUTER APPLICATIONS FIRST SEMESTER DEGREE EXAMINATION MAY 2025

Java Programming

Duration:3 Hours **Max Marks:70**

Part A

I. Answer any THREE of the following : **3×4= 12**

1. Discuss operators in Java. Explain relational and logical operators in detail with an example.
2. Explain the Object class in Java with its key methods and an example.
3. Describe packages in Java. Explain the concepts of built-in and user-defined packages.
4. Discuss the concept of adapter classes in Java with a suitable example.

Part B

II. Answer any FOUR of the following : **4×7= 28**

5. Write a Java program to demonstrate String manipulation, array and loops by checking if two entered strings are anagrams. The program should ignore spaces and be case-insensitive.
6. Write a Java program using the class Student to demonstrate call by reference by updating student details within a method and showing how the changes persist outside the method.
7. Analyse the concept of an interface in Java. Explain how interface references are used in Java with a suitable example.
8. Examine nested try statements in Java. Explain its working with syntax and a code illustration.
9. Explain control components of Swing in detail with an example.

Part C

III. Answer any THREE of the following : **3×10= 30**

10. Evaluate the concept of exception hierarchy in Java. Examine checked and unchecked exceptions with relevant examples.
11. Discuss different types of control statements in Java with appropriate code examples.

12. Describe access control in Java with respect to inheritance by explaining different access modifiers with syntax and examples.

13. Examine the steps required to connect a Java application to a database. Analyze how each step contributes to establishing a successful database connection.

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24MCAS105 Reg No : .....

CHOICE BASED CREDIT SYSTEM

MASTER OF COMPUTER APPLICATIONS FIRST SEMESTER DEGREE EXAMINATION MAY 2025

Mathematical and Statistical Foundations

Duration:3 Hours **Max Marks:70**

Part A

I. Answer any THREE of the following : **3×4= 12**

1. Find the determinant of the following matrix

$$\begin{bmatrix} 5 & 2 & 3 \\ 2 & 3 & 1 \\ 6 & 1 & -2 \end{bmatrix}$$

2. Which of these following collections of subsets are partition of {-3,-2,0,1,2,3}
   a) {-3,3} {-2,2} {-1,1} {0}
   b) {-3,-2,2,3} {-1,1}

3. Consider the following statements:
   R: Mark is rich; H: Mark is happy
   Write the following statements in symbolic form and draw the truth table for the same.
   Mark is rich or unhappy.

4. Given x : 9,7,5,11,1,5,7,3. Calculate the range and standard deviation.

Part B

II. Answer any FOUR of the following : **4×7= 28**

5. Determine the rank of the following matrix by reducing it to row echelon form

$$\begin{bmatrix} 0 & 1 & 2 & 1 \\ 1 & 2 & 3 & 2 \\ 3 & 1 & 1 & 3 \end{bmatrix}$$

6. Given that f is a function from R to R defined by
   $f(x) = 7x^2 - 4 \forall x \in R$. Find the inverse of f.

7. Calculate the median for the following grouped data.

Class	118-126	127-135	136-144	145-153	154-162	163-171	172-180
Frequency	3	5	9	17	5	4	2

8. Determine whether the following statement is a tautology or not by constructing truth tables.
   $(P \vee Q) \vee R) \iff (P \vee (Q \vee R))$

9. Explain negative and positive skewness , indicate it using curves. Calculate coefficient of skewness from the following: Median=18.8inches, Q1=14.6inches, Q3=5.2inches.

Part C

III. Answer any THREE of the following : **3×10= 30**

10. Determine the inverse of the following matrix using Cayley Hamilton Theorem.

$$\begin{bmatrix} 4 & -4 & -1 \\ 1 & 1 & -1 \\ -1 & 2 & 4 \end{bmatrix}$$

11. Let N be a set of Natural numbers including 0. Determine whether the function f from N to N is a bijection if

$f(x) = x^2 + 2$

12. Justify whether the given expression is a tautology.

$[(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$

13. Illustrate the usage of the following probability distributions.

    1. Binomial Distribution
    2. Normal Distribution
    3. Poisson Distribution

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