Seat No.	

Set P

M.C.A (Semester - I) (New) (CBCS) Examination: March/April - 2025
Object Oriented Programming using C++ (MCA0101)

Day & Date: Thursday, 15-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No.3 to Q. No.7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) The operator ____ is called the 'extraction' or 'get from' operator.
a) < b) >>
c) << d) >

2) ____ are the examples of library functions in C++.
a) *strlen(), clrscr()* b) *clrscr(), getAge()*
c) *calculatetotal()* d) *strlen(), displayName()*

3) A member data or member function of a class is accessed using the ____.
a) > operator b) '·' (period) operator
c) scoping operator :: d) insertion operator <<

4) A ____ although not a member function, has full access rights to the private members of the class.
a) friend function b) public function
c) private function d) protected function

5) Which of the following statements are true about constructor?
i) A constructor will have exact same name as the class
ii) A constructor does not have any return type at all, not even void.
iii) You can define constructors having parameters.
a) only (i) b) both (i) and (ii)
c) both (i) and (iii) d) All (i), (ii) and (iii)

6) Elements of an array can be accessed ___ using indices of an array.
a) randomly b) only sequentially
c) only in reverse d) none of these

7) A two dimensional array can be seen as a table with 'x' rows and 'y' columns where the column number ranges from_____
a) 0 to (x-1) b) 0 to x
c) x to y d) 0 to (y-1)

8) Variables that hold memory addresses are called ____.

a) objects b) structures
c) pointers d) integers

9) The unary operator ____ perform the task of allocating the memory.

a) malloc() b) calloc()
c) new d) realloc()

10) What is the output of the following program

```
#include <iostream.h>
#include <conio.h>
void fun(int a, int b)
{
    a += 20;
    b += 30;
}
void main()
{
    int x = 10, y = 50;
    clrscr();
    fun(x, y);
    cout << x << " " << y;
}
```

a) 30 80 b) 10 50
c) 30 50 d) 10 80

B) State whether true or false: **06**

1) *'C'* is an example of string constant.
2) *'new'* operator may be used to allocate memory dynamically and that too of any type.
3) More than one user-defined function can have the same name and perform different operations. This is a powerful feature of C++ and is known as operator loading.
4) Constructors are member functions of a class that have the same name as the name of any data member of the class
5) The destructor is used for initializing of variables.
6) In C++ strings are nothing but character arrays.

Q.2 Write short notes on the following: **16**

a) Inline function
b) Friend function
c) for loop
d) Access specifiers in C++

Q.3 Answer the following question **16**

a) What is a flow chart? What are the symbols used to draw a flow chart?

b) Write the algorithm to calculate factorial of a number.

Q.4 Answer the following question **16**

a) Describe the importance of destructor. Explain its use with a program.

b) What is multiple inheritance? Write a program to demonstrate the multiple inheritance.

Q.5 Answer the following question **16**

a) What is function overloading? Write a program to demonstrate function overloading.

b) What is role of manipulators in C++. Write down different manipulators in C++.

Q.6 Answer the following question **16**

a) Explain the role *of seekg(), seekp(), tellg(), tellp() function* in the process of random access in a file.

b) Write a C++ program to swap two numbers using pointer.

Q.7 Answer the following question **16**

a) Discuss exception handling mechanisms in C++.

b) Draw a neat and clean sketch to show the different streams available in C++.

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Set **P**

M.C.A (Semester - I) (New) (CBCS) Examination: March/April - 2025
Data Structures (MCA0102)

Day & Date: Saturday, 17-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question No.l and 2 are compulsory.
2) Attempt any 3 questions from Q. No.3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives: **10**

1) Minimum number of fields in each node of a doubly linked list is____
a) 4 b) 2
c) 3 d) 1

2) Finding the location of a given item in a collection of items is called ____
a) Discovering b) Searching
c) Finding d) Mining

3) ____ form of access is used to add and remove nodes from a queue
a) LIFO, Last In First Out b) FIFO, First In First Out
c) Both a and b d) None of these

4) Which of the following data structure can't store the non-homogeneous data elements?
a) Arrays b) Records
c) Pointers d) Stacks

5) Which of the following is an application of stack?
a) Finding factorial b) Tower of Hanoi
c) Infix to Postfix d) All the above

6) Which of the following is a linear data structure?
a) Binary tree b) AVL tree
c) Array d) Graphs

7) What is the maximum number of swaps that can be performed in the Selection Sort algorithm?
a) n-l b) N
c) 1 d) n-2

8) Which of this best describes an array?
a) A data structure that shows a hierarchical behaviour
b) Container of objects of similar types
c) Arrays are immutable once initialized
d) Array is not a data structure

9) In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?
a) Pointer to character b) Pointer to integer
c) Pointer to node d) Node

10) What is the maximum number of children that a binary tree node can have?
a) 0 b) 1
c) 2 d) 3

Q.1 B) State whether true or false: **06**

a) A binary tree is a rooted tree but not an ordered tree.
b) General ordered tree can be encoded into binary trees.
c) In a circular doubly linked list with 10 nodes, we will need to change 4 links if we want to delete a node other than the head node.
d) When an affay is passed to a function, the function receives a copy of the array (call by value)
e) Most appropriate data structure to print a list of elements in reverse order is Queue data structure.
f) The largest value in a binary search tree is always stored at the right most node of the tree.

Q.2 Write short answers. **16**

a) What do you mean Merge Sort?
b) What is Front and Rear?
c) Explain in brief Array Indexing?
d) Define Data Structure?

Q.3 Answer the following:

a) What is Sorting? Explain in detail Bubble Sort passes of given below series- **08**
89,75, 13, 8, 95, 58, 43, 65,27, 41

b) State and show Binary Search Tree of below given series and perform Pre order, In-order and post-order traversal of the generated Binary Tree. **08**
Series- 235,300, 178, 900, 456, 800, 200, 600,700, 500, 85, 100, 7, 400

Q.4 Answer the following:

a) Define Doubly Linked List? State the procedure of insertion and deletion of the data item at beginning, middle and end of Singly Linked List with suitable example. **08**

b) Discuss in detail applications of Stack with suitable example? **08**

Q.5 Answer the following:

a) What do you mean by Priority Queue? Explain in detail insertion and deletion operation on Circular Queue with suitable example? **08**

b) State and explain Stack Overflow and Underflow conditions with suitable example? **08**

Q.6 Answer the following:

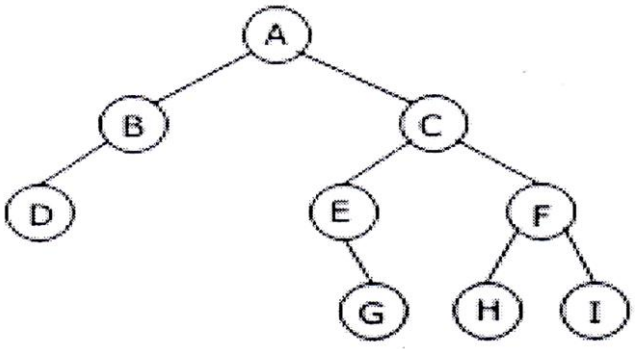
a) What is Matrix? Explain the Sparse Matrix with suitable example? **08**

b) State and explain Primitive Data Structures with suitable example? **08**

Q.7 Answer the following:

a) State and compare the Single and Multidimensional array with suitable example. **08**

b) What is Binary Tree? Perform and result Pre, In and Post Order traversing of below given Tree? **08**



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Set P

M.C.A (Semester - I) (New) (CBCS) Examination: March/April - 2025
Advanced DBMS (MCA0103)

Day & Date: Monday, 19-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory.
2) Attempt any three questions from Q.No.3 to Q.No.7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) _____ Level of abstraction describes how the data are actually stored.
a) Physical b) Logical
c) View d) None

2) A _____ is used to refer to a program to fetch and process the rows returned by the SQL statement, one at a time.
a) Procedure Cursor
c) Loin View

3) In relational algebra _____ denotes the "Select" operation.
a) Π b) $\cap$
c) X d) σ

4) _____ lock is also known as a read-only lock. In this lock, the data item can only read by the transaction.
a) Shared b) Exclusive
c) Mutual d) None of these

5) If there is no transitive dependency for non-prime attributes, then the relation must be in _____ normal form.
a) Third b) Second
c) BCNF d) First

6) _____ is used to represent multivalued attribute
a) Double oval b) Dotted oval
c) diamond d) Ellipse

7) ALTER TABLE in SQL can be used to _____.
a) Add an attribute
b) Delete an attribute
c) Alter the default values of an attribute
d) All of the above

8) _____ specifies a search condition for a group or an aggregate
a) GROUP BY clause HAVING clause
c) FROM clause WHERE clause

9) Rows of a relation are known as the _____.
a) Degree b) Tuples
c) Entity d) All of the above

10) Which one of the following keyword is used to find out the number of values in a column?
a) TOTAL b) COUNT
c) SUM d) ADD

B) Write True/False **06**

a) SQL does not permit distinct with count(*).
b) The active state is the second state of every transaction.
c) Nested queries are a way to perform more complex queries by Embedding one query within another.
d) Table is the basic data storage unit in a relational database
e) Data redundancy means reducing data duplication.
f) The log is sequence of log records recording all the update activities in the database.

Q.2 Answer the following questions. **16**

a) Differentiate between Schema & Instance.
b) Elaborate on primary key & foreign key in short.
c) Explain commands with respect to SQL:
i) Rename
ii) Alter
d) What is join? Explain any two types of joins with example

Q.3 Answer the following questions. **16**

a) What is normalization? Explain 3NF & 4NF.
b) Explain catastrophic and non-catastrophic failures in brief.

Q.4 Answer the following questions. **16**

a) Discuss eight advantages of DBMS in details.
b) Explain CREATE, ALTER, DROP, TRUNCATE in brief.

Q.5 Answer the following questions. **16**

a) What is distributed database? Explain types of distributed database.
b) What is DBMS? Explain architecture of DBMS.

Q.6 Answer the following questions. **16**

a) Discuss two types of exceptions in PL/SQL in brief.
b) Describe the steps involved in query processing.

Q.7 Answer the following questions. **16**

a) What are the functional operations is relational algebra? Explain with suitable example.

b) Explain the following terms-

i) Entity
ii) Entity set
iii) Relation
iv) Attributes

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Set P

M.C.A (Semester - I) (New) (CBCS) Examination: March/April - 2025
Software Engineering (MCA0104)

Day & Date: Saturday, 24-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.
2) Attempt any three question from Q.No.3 to Q.No.7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Unit testing is done by _____.
a) Users b) Developers
c) Customers d) None of the mentioned

2) SDLC stands for _____.
a) Software Development Life Cycle
b) System Development Life cycle
c) Software Design Life Cycle
d) System Design Life Cycle

3) Which of the following is an indirect measure of product?
a) Quality b) Complexity
c) Reliability d) All of the mentioned

4) What encapsulates both data and data manipulation functions?
a) Object b) Class
c) Super class d) Sub class

5) Which one of the following is a requirement that fits in a developer's module?
a) Availability b) Testability
c) Usability d) Flexibility

6) Which one of the following is a requirement that fits in a developer's module?
a) Availability b) Testability
c) Usability d) Flexibility

7) What type of software testing is generally used in Software Maintenance?
a) Regression Testing b) System Testing
c) Integration Testing d) Unit Testing

8) Which one of the following is not a step of requirement engineering?
a) Elicitation b) Design
c) Analysis d) Documentation

9) Structured Analysis is based on the principles of _____.
   a) Top-down decomposition approach
   b) Divide and conquer principle
   c) Graphical representation of results using DFDs
   d) All of the mentioned

10) Which of the following manuals is not a user documentation?
   a) Beginner's Guide b) Installation guide
   c) Reference Guide d) SRS

B) Write true/ false **06**

1) RAD Model has high reliability requirements.
2) Does software wear & tear by decomposition.
3) A function-oriented design focuses on the entities in the system rather than the data processing activities.
4) Regression testing is a very expensive activity.
5) Requirements analysis is an Iterative process.
6) Statement and branch coverage metrics are part of Source Code.

Q.2 Answer the following. **16**

a) Write short note on requirements specification.
b) Explain the different types of testing.
c) What is Interface design?
d) What is Evolutionary software process model?

Q.3 Answer the following. **16**

a) Explain in detail data design and architectural design.
b) Explain different myths in software engineering.

Q.4 Answer the following. **16**

a) Explain the linear sequential model in detail.
b) What is Software Engineering? Explain RAD model.

Q.5 Answer the following. **16**

a) What is Software Measurement? Explain size oriented and function oriented metrics in detail?
b) Explain Object Oriented Design in detail.

Q.6 Answer the following.

a) Explain a layered technology of software engineering.
b) Differentiate functional requirement and nonfunctional requirement.

Q.7 Answer the following.

a) Define software metrics. Why do we really need metrics in software?
b) Explain white box testing and black box testing in detail.

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Set **P**

M.C.A (Semester - I) (New) (CBCS) Examination: March/April - 2025
Operating Systems (MCA0105)

Day & Date: Monday, 26-May-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos.1 and 2 are compulsory.
2) Attempt any three questions from Q. No.3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Select the correct alternative. **10**

1) A deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition can never exist.
   a) resources b) operating system
   c) resource allocation state d) system storage state

2) To access the services of operating system the interface is provided by the _____.
   a) API b) System Calls
   c) Library d) None of these

3) The _____ swaps processes in and out of the memory.
   a) CPU b) Memory manager
   c) User d) CPU manager

4) Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called?
   a) Paging b) Fragmentation
   c) Mapping d) None of the mentioned

5) In FIFO page replacement algorithm, when a page must be replaced _____.
   a) oldest page is chosen b) newest page is chosen
   c) random page is chosen d) none of the mentioned

6) A file is a/an _____ data type.
   a) public b) private
   c) abstract d) primitive

7) _____ type of kernel does the entire operating system run as a single program?
   a) Microkernel kernels b) Monolithic kernel
   c) Hybrid kernel d) None of these

8) _____ of the following activities are managed by disk management.
   a) Free space management b) Storage allocation
   c) Disk scheduling d) All of the above

9) The strategy of making processes that are logically runnable to be temporarily suspended is called _____.
   a) Non preemptive scheduling
   b) Preemptive scheduling
   c) Shortest job first
   d) First come First served

10) A memory page containing a heavily used variable that was initialized very early and is in constant use is removed, then the page replacement algorithm used is _____.
   a) LRU b) LFU
   c) FIFO d) None of the mentioned

B) State whether true or false. **06**

1) Communication between two process is interprocess communication.
2) The address generated by the CPU is referred to as Logical address.
3) Seek time always greater than Disk access time.
4) A page fault occurs when a page cannot be accessed due to its absence from memory.
5) A system is in the safe state if the system can allocate resources to each process in some order and still avoid a deadlock.
6) The CPU manager swaps processes in and out of the memory.

Q.2 Write short notes on. **16**

a) Segmentation
b) Semaphore
c) Batching
d) Directory

Q.3 Answer the following. **16**

a) What is operating system? What are functions of operating system?
b) Explain following scheduling algorithm.
   1) First come first serve
   2) Shortest job first

Q.4 Answer the following. **16**

a) What is system calls? Explain different categories of system calls with example?
b) What is paging? Explain Page tables in detail?

Q.5 Answer the following. **16**

a) What is a file? Explain file structure in detail?
b) What is deadlock? Explain necessary conditions for the occurrence of deadlock in detail?

Q.6 Answer the following. **16**

a) What is swapping? Explain in detail?

b) Explain the difference between process and thread in detail.

Q.7 Answer the following. **16**

a) What is Virtual Memory? Explain in detail?

b) What is program threats and system threats?

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M.C.A. (Semester - I) (New) (CBCS) Examination: March/April - 2025
Discrete Mathematical Structures (MCA0109)

Day & Date: Wednesday, 28-05-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) If the edges of the walk W are distinct then W is called _____.
a) trail b) path
c) cycle d) closed walk

2) If A is a subset of B and B is subset of C then _____.
a) A is a subset of C b) B is a subset of A
c) C is a subset of B d) $A = C$

3) The sum of the diagonal elements of a square matrix A is called as _____ of A.
a) Rank b) Determinant
c) Nullity d) Trace

4) A function $f: A \to B$ is said to be _____ function if each element of B is the image of some element of A.
a) one to one b) onto
c) into d) many one

5) The generating function of the sequence $0,1,2,3,---$ is
a) $\sum_{k=0}^{\infty} x^k$ b) $\sum_{k=0}^{\infty} (k+1).x^k$
c) $\sum_{k=0}^{\infty} k.x^{-k}$ d) $\sum_{k=0}^{\infty} k.x^k$

6) A chain that is not a subset of larger chain is called _____.
a) antichain b) maximal chain
c) length of a chain d) isthmus

7) The co-factor of an element occurring in r^{th} row and s^{th} column is _____.
a) $(-1)^{rs}$ times its minor b) $(-r)^s$ times its minor
c) $(-1)^{r-s}$ times its minor d) $(-1)^{r+s}$ times its minor

8) If a finite set S has n elements, then the power set of S has _____ elements.

a) 2^n b) $2n$
c) n^2 d) $2 + n$

9) 12_{Cr} is greatest when r is equal to _____.

a) 7 b) 6
c) 12 d) 0

10) The determinant has a _____.

a) no fixed value b) fixed value
c) positive value d) negative value

B) Fill in the blanks. **06**

1) If any five integers from 1 to 8 are chosen, then at least two of them will have a sum _____.
2) If for any two vertices u and v of a graph G there is a path from u to v then G is _____.
3) If A and B be any two matrices of same order then $(A + B)^T =$ _____.
4) If A and B are subsets of a universal set U then, $(A \cap B)^{\sim} =$ _____.
5) The system of linear homogeneous equations are always _____.
6) Two edges 'e' and 'f' which are incident with a common vertex v are said to be _____.

Q.2 Answer the following. **16**

a) Define proper set and infinite set.

b) Show that the relation $\geq$ is a partial order on the set of integers.

c) If $A = \begin{bmatrix} 1 & -1 & 3 \\ 4 & 5 & -8 \\ 7 & 2 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 7 \end{bmatrix}$ then find $A + B, A - B$

d) Show that $(p \vee q) \vee r \equiv p \vee (q \vee r)$

Q.3 Answer the following. **16**

a) Find the eigen values of the matrix $\begin{bmatrix} 1 & 0 \\ 3 & 4 \end{bmatrix}$

b) Draw the Hasse diagram of the poset $(P(S), \subseteq)$ is the power set on $S = \{1,2,3\}$

Q.4 Answer the following. **16**

a) Explain the following terms with examples.
   i) Reflexive relation
   ii) Symmetric relation

d) Write a note on regular and bipartite graph.

Q.5 Answer the following. **16**

a) Prove that $n_{c_r} + n_{c_{r-1}} = n + 1_{c_r}; 0 \leq r \leq n$

b) Prove that the set $\{0,1,2,3,4\}$ is a finite abelian group of order 5 under addition modulo 5.

Q.6 Answer the following. **16**

a) Construct the truth table for each of the following statement patterns.

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

b) Find adjoint of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 5 \\ 3 & 6 & 7 \end{bmatrix}$

Q.7 Answer the following. **16**

a) Prove that in any graph G the number of vertices of odd degree is always even.

b) Explain the following statement patterns with truth table.

i) Conjunction
ii) Conditional
iii) Biconditional

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Set P

M.C.A. (Semester - II) (New) (CBCS) Examination: March/April - 2025
Java Programming (MCA01201)

Day & Date: Wednesday, 14-05-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Which of the following is a valid keyword?
a) volatile b) virtual
c) friend d) null

2) What is the default value of an int variable?
a) 0 b) 1
c) Undefined d) Null

3) Which operator is used to evaluate a condition and return a value?
a) && b) II
c) ?: d) >>

4) What is the primary purpose of this keyword?
a) Refer to the parent class b) Refer to the current object
c) Refer to a static method d) Create objects

5) Which method is used to append data to a string in StringBuffer?
a) concat() b) append()
c) join() d) add()

6) How does Java handle memory management for objects?
a) Manual memory allocation
b) Garbage collection
c) Memory deallocation using free()
d) Dynamic allocation only

7) Which class is serves as the root of the exception hierarchy?
a) Throwable b) Exception
c) Error d) RuntimeException

8) Which method is used to start a thread?
a) init() b) run()
c) start() d) begin()

9) What is the default layout manager for a JFrame?

a) GridLayout b) FlowLayout
c) BorderLayout d) CardLayout

10) Which JDBC driver type is platform-independent?

a) Type 1 b) Type 2
c) Type 3 d) Type 4

B) Write True/False. **06**

1) The break statement is used to exit from a loop or switch statement.
2) In Java, strings are mutable by default.
3) A final class can be inherited.
4) Threads are shares the same memory space.
5) JDBC is used for GUI programming.
6) The finalize() method is used for garbage collection.

Q.2 Answer the following. **16**

a) What are the benefits of using constants?
b) Explain the difference between a while loop and a for loop.
c) What is an abstract class? Explain with example.
d) How do you create a two-dimensional array? Explain with example.

Q.3 Answer the following. **16**

a) Discuss the key differences between primitive data types and objects.
b) Explain the usage of the switch statement with an example.

Q.4 Answer the following. **16**

a) Describe exception handling with an example that uses throw and catch.
b) What are the differences between String and StringBuffer?

Q.5 Answer the following. **16**

a) Explain the thread lifecycle with the help of a diagram.
b) Write a program to demonstrate reading and writing to a file using Java I/O.

Q.6 Answer the following. **16**

a) What is synchronization? Why is it needed? Explain with an example.
b) How do you create and execute a thread using the Runnable interface?

Q.7 Answer the following. **16**

a) Explain the event delegation model with a suitable example.
b) Write the basic steps to establish a connection to a database using JDBC and execute an SQL query.

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Set **P**

M.C.A (Semester - II) (New) (CBCS) Examination: March/April - 2025
Python Programming (MCA01202)

Day & Date: Friday, 16-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No.1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No. 3 Q. No. 7
3) Figures to the right indicate full marks.

Q.1 A) Select the correct alternatives. **10**

1) Which is the correct operator for exponential (X raise to Y)?
   a) X??Y b) X**Y
   c) X^^Y d) X*Y

2) What error occurs when you execute the following Python code snippet?

```
apple = mango
```

   a) SyntaxError b) NameError
   c) ValueError d) TypeError

3) What data type is the object below?

```
L = [1, 2, 'hello', 'python']
```

   a) List b) Dictionary
   c) Array d) Tuple

4) What will be the output of the following code?

```
X = ['python', 'programming']
for i in X:
    i.upper()
print(X)
```

   a) PYTHON PROGRAMMING
   b) ['python', 'programming']
   c) [PYTHON PROGRAMMING]
   d) [python programming]

5) Nothing happen when _____ statement is executed.
   a) pass b) break
   c) continue d) switch

6) Which of the following function headers is correct?
   a) def fun (a = 2, b = 3, c): b) def fun (a = 2, b, c = 3):
   c) def fun (a, b = 2, c = 3): d) def fun (a, b, c = 3, d):

7) Following set of commands are executed in shell, what will be the output?

```
>>>str = 'hello'
>>>str [:2]
```

a) he b) lo
c) olleh d) hello

8) Which OS module is used to create directories in the current path?
a) Mkdir() b) os.mkdir()
c) os.dir() d) rmdir()

9) Which module is required to support regular expression?
a) regular b) re
c) regex d) pyregular

10) For what purpose, the "***bg***" is used in Tkinter widget?
a) To change the direction of widget
b) To change the size of widget
c) To change the color of widget
d) To change the background of widget

B) State whether true or false. **06**

1) Django follows *MVT (Model View Template)* design pattern.
2) NumPy's arrays are optimized for homogeneous numeric data that is accessed via integer indices.
3) A thread can be defined as the smallest unit that can be scheduled in an operating system.
4) Cursor in Python is an object which helps to execute the query and fetch the records from the database.
5) Syntax errors are run-time errors or unusual conditions that a program may encounter during execution
6) The write() method is used to write a string to an opened file.

Q.2 Write short notes on. **16**

a) Escape sequences in Python
b) Difference between list and tuple
c) range function
d) Generator

Q.3 Answer the following. **16**

a) Explain any four string methods with example.
b) How to declare and call functions in Python programs? Illustrate with an example script.

Q.4 Answer the following. **16**

a) Explain about methods in Lists of Python with appropriate examples.
b) Write in brief about Tuple in python. Write operations of tuple with suitable example.

Q.5 Answer the following. **16**

a) Explain about variable length arguments. Write a program with user defined function to illustrate variable length arguments.

b) How does try-except statement work? Explain with example.

Q.6 Answer the following. **16**

a) Write a Python program that creates a GUI with a textbox, Ok button and Quit button. On clicking Ok, the text entered in textbox/entry box is to be printed in Python shell; on clicking Quit, the program should terminate.

b) How to declare a constructor method in python? Explain.
Explain the feature of Inheritance in python with an example.

Q.7 Answer the following. **16**

a) What is NumPy? What are different array attributes?

b) What is Django? Explain.

Seat No.	

Set **P**

M.C.A (Semester - II) (New) (CBCS) Examination: March/April - 2025
Computer Communication Network (MCA01203)

Day & Date: Tuesday, 20-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives (MCQ). **10**

1) Which one of the following is not a network topology?
   a) Star b) Ring
   c) Bus d) Peer to peer

2) The maximum length (in bytes) of an IPv4 datagram is?
   a) 32 b) 1024
   c) 65535 d) 512

3) When the mail server sends mail to other mail servers it becomes ____.
   a) SMTP client b) SMTP server
   c) Peer d) Master

4) The length of an IPv6 address is?
   a) 32 bits b) 64 bits
   c) 128 bits d) 256 bits

5) Which of the following address belongs class A?
   a) 121.12.12.248 b) 130.12.12.248
   c) 128.12.12.248 d) 129.12.12.248

6) Which of the following cannot be used as a medium for 802.3 ethernet?
   a) A thin coaxial cable b) A twisted pair cable
   c) A microwave link d) A fiber optical cable

7) How many versions of IP are available?
   a) 6 version b) 4 version
   c) 2 version d) 1 version

8) Which layer of the TCP / IP stack corresponds to the OSI model transport layer?
   a) Host to host b) Application
   c) Internet d) Network Access

9) The term IPv4 stands for?
   a) Internet Protocol Version 4
   b) Internet Programming Version 4
   c) International Programming Version 4
   d) None of these

10) Which of the following is share the data of two computer?
   a) Library b) Network
   c) Grouping d) Integrated system

B) State True or False. **06**

1) TCP is called connectionless because all UDP packets are treated independently by transport layer.
2) Electronic mail uses SMTP application layer protocol.
3) Modem is a hardware device which provides a connection between the computer and the transmission media.
4) A subset of a network that includes all the routers but contains no loops is called spanning tree.
5) A server can run on a workstation computer.
6) Today fiber-optic cable is the media of choice for backbone networks.

Q.2 Write short notes. **16**

a) Jitter
b) Ad hoc Network
c) User Datagram Protocol (UDP)
d) Address Resolution Protocol (ARP)

Q.3 Answer the following.

a) Explain OSI reference model. **08**
b) What is TCP? Explain TCP segment header structure in detail. **08**

Q.4 Answer the following.

a) Explain various congestion prevention policies. **08**
b) Explain Tunnelling mechanism in detail **08**

Q.5 Answer the following.

a) Explain Flow-Control and Buffering mechanism in transport layer. **08**
b) What is the CRC code of Frame 1 1 0 1 0 1 1 0 1 1 using the generator code 1 0 0 1 1? **08**

Q.6 Answer the following.

a) Explain token bucket algorithm. **08**
b) Give the simple transport service and TCP primitives. **08**

Q.7 Answer the following.

a) Explain Electronic Mail in detail. **08**

b) Explain store and forward packet switching technique. **08**

Seat No.	

Set **P**

M.C.A (Semester - II) (New) (CBCS) Examination: March/April - 2025
System Software (MCA01204)

Day & Date: Thursday, 22-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q.No.1 and 2 are compulsory
2) Attempt any three questions from Q.No. 3 to Q. No. 7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) System Software consists of variety of programs that supports the operation of a _____
   a) Controller b) Clock pulse
   c) Compiler d) Computer

2) A machine language program was loaded into memory and prepared for _____ by a loader.
   a) Waiting b) Execution
   c) Resuming d) Termination

3) _____ machines generally have relatively large and complicated instruction set, several different instruction formats and lengths and many different addressing modes.
   a) Core Intel Set Chipsets.
   b) Complex Instruction Set Computers
   c) Computer Interpreter Set Compilers
   d) Connection Internet Set Controllers

4) Assembler directives _____ used to generate one-word integer constant.
   a) END b) START
   c) WORD d) BYTE

5) A linkage editor produces a linked version of the program which is written to a file or _____ for later execution.
   a) Relocation b) Register
   c) Library d) Loader

6) Most MS-DOS _____ produces object modules, not executable machine language programs.
   a) Compilers and Linker b) Compilers and Assemblers
   c) Assemblers and Loader d) Loader and Linker

7) A _____ instructions allow the programmer to write a shorthand version of the program.
   a) Modem b) Micro
   c) Macro d) Module

8) Compiler bridges the _____ gap between a programming language domain and an execution domain and generates a target program.
   a) Syntactic b) Sentence
   c) Semantic d) Structure

9) A static binding is performed the execution of a program begins.
   a) After b) Before
   c) Post d) Later wards

10) System programming is used to describe the collection of techniques used in the design of _____ programs.
   a) System b) Software
   c) Instruction d) Resource

B) State True False **06**

a) The Job Control Language allowed a programmer to indicate which program constituted a job and implemented their execution in specified sequence.
b) Early Operating system had Graphical User Interface, which required a user to type in a command and its parameters.
c) A Modem represents a commonly used group of statements in the source programming language.
d) RISC machines generally have a relatively large and complicated instruction set, several different instruction formats and lengths, and many different addressing modes.
e) Fundamental functions of each piece of software based on a Simplified Instructional Computer (SIC) - a hypothetical computer.
f) Hardware program also perform various tasks that user is often unaware of, such as reading a program for execution by linking it with other programs etc.

Q.2 Answer the following. **16**

a) What is MASM?
b) Define YACC Compiler?
c) What is Macro?
d) What is SunOS Linker?

Q.3 Answer the following. **16**

a) State the meaning of Loader. Explain in detail various features of machine independent loader?
b) What is ISC? State and Explain in detail CISC and RISC Machines?

Q.4 Answer the following. **16**

a) What do you mean by Compiler? State and Explain the basic functions and various features of the compiler?

b) State and explain in detail essential difference between a linkage editor and linking loader on the basis of processing of an object program?

Q.5 Answer the following. **16**

a) State and explain in detail various functions required to accomplish translation of source program to object code in a simple SIC Assembler?

b) What is Dynamic Linking? What is the process of loading and calling of a subroutine using Dynamic Linking?

Q.6 Answer the following. **16**

a) What is Bootstrap Loader? State and Explain in detail design of absolute loader and related functions?

b) What is Assembler? Explain in detail One pass and Multi pass Assemblers?

Q.7 Answer the following. **16**

a) Define System Software? Discuss in detail SIC standard model Machine Architecture with most commonly encountered hardware features?

b) What do you mean by ANSI C? Explain Macro processing features of ANSI C programming language with suitable example?

SLR-YI-12

Seat No.	

Set P

M.C.A (Semester - II) (New) (CBCS) Examination: March/April - 2025
UML (MCA01207)

Day & Date: Tuesday, 27-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) What does UML stand for?
a) Unified Modeling Language
b) Unified Method Language
c) Universal Modeling Language
d) Universal Method Logic

2) Which of the following is NOT a UML diagram?
a) Class Diagram b) Use Case Diagram
c) Flowchart Diagram d) Sequence Diagram

3) A class in a UML Class Diagram is represented by _____.
a) A circle
b) A rectangle with compartments
c) A triangle
d) A diamond

4) The generalization relationship is represented by _____.
a) Solid line with arrowhead
b) Dotted line
c) Solid line with a hollow triangle
d) Line with a filled diamond

5) Which diagram is best suited to represent the workflow of a system?
a) Activity Diagram b) Sequence Diagram
c) Class Diagram d) Component Diagram

6) In UML class diagrams, a private attribute is denoted by which symbol?
a) + b) #
c) - d) *

7) Which of the following relationships indicates inheritance in UML?
a) Association b) Aggregation
c) Generalization d) Dependency

8) What does a use case diagram primarily represent?
a) System architecture
b) Functional requirements of the system
c) Object interactions
d) None of these

9) Which of the following is NOT a component of a use case diagram?
a) Actor
b) Use Case
c) Class
d) System boundary

10) What does a sequence diagram primarily show?
a) Static structure of the system
b) Interaction between classes
c) Time-ordered interaction between objects
d) Use case logic

B) State whether true or false. **06**

1) In a deployment diagram, a node typically represented by box (Cube).
2) In a sequence diagram, the vertical dashed line below an object called as lifeline.
3) A Package Diagram is used to group related elements.
4) A Sequence Diagram represents the static structure of a system.
5) Stereotypes in UML allow the customization of elements.
6) An Activity Diagram can have multiple start points.

Q.2 Write short notes on. **16**

a) Concept of Association in UML.
b) Behavioral things.
c) Process and thread.
d) Interface.

Q.3 Answer the following. **16**

a) Explain UML software development life cycle.
b) Draw the use case diagram for online digital library system.

Q.4 Answer the following. **16**

a) Describe the “Dependency” and "Generalization" relationship in UML.
b) Describe the different types of UML diagrams and their purpose.

Q.5 Answer the following. **16**

a) Explain the difference between activity diagrams and state machine diagrams in UML.
b) What is an instance and orphan instance? How an instance, anonymous instance, orphan instance and multiobject are graphically rendered in UML?

Q.6 Answer the following. **16**

a) What is a state machine diagram in UML?

b) What is activity diagram? What is the role of swimlanes in an activity diagram?

Q.7 Answer the following. **16**

a) What is a component? How it is represented in UML? What are different kinds of components?

b) What is an event? Describe Time and Change events.

Seat No.	

Set **P**

M.C.A (Semester - II) (New) (CBCS) Examination: March/April - 2025
Office Automation (MCA01209)

Day & Date: Sunday, 01-June-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Computer_____ is the collection of physical elements that constitutes a computer system.
a) Software b) Hardware
c) Program d) Package

2) Which of the following do you use to change margins?
a) Formatting b) Page setup dialog box
c) Standard toolbar d) Paragraph dialog box

3) Which enables us to send the same letter to different persons?
a) Macros b) Template
c) Mail Merge d) None of above

4) _____Computers can perform the same task repeatedly & with the same accuracy without getting tired.
a) Versatility b) Accuracy
c) Diligence d) Speed

5) Which is not in MS word?
a) Italic b) Magic tool
c) Font d) Bold

6) Which of the following is the correct way to start a formula in Excel?
a) = b) +
c) * d) /

7) Which of the following is the keyboard shortcut to open the "Find and Replace" dialog box in Excel?
a) Ctrl + F b) Ctrl + H
c) Ctrl + R d) Ctrl + P

8) Which of the following is an example of page orientation?
a) Landscape b) Subscript
c) Superscript d) A4

9) _____Contains the list of menus available inside word, each menu contains a specific set of commands.

a) Title bar b) menu bar
c) standard toolbar d) Formatting toolbar

10) _____Creates a new blank document based on the default template.

a) Open b) Save
c) New d) Print

B) Write true or false. **06**

1) Spreadsheet displays data in the form of rows and columns.
2) Office automation includes tasks such as word processing, data entry, and email management.
3) You cannot add images, audio, or video to a PowerPoint presentation.
4) In MS-Word Ctrl + V is used to cut the selected text.
5) RAM (Random Access Memory) is a permanent storage device in a computer.
6) Monitor is an Input device.

Q.2 Answer the following questions. **16**

a) Explain copy and paste operations in MS-Word.
b) What is Spread Sheet and Explain its applications.
c) Explain the Characteristics of Computer.
d) What is the use of PowerPoint Presentation?

Q.3 Answer the following questions. **16**

a) What is Mail Merge? Write the steps to create mail merge in MS-Word.
b) What is Window? Explain functions of Windows?

Q.4 Answer the following questions. **16**

a) Explain Formatting Document in MS-Word.
b) What is MS-Access? Explain how we create a new database in MS-Access.

Q.5 Answer the following questions. **16**

a) What is Presentation? Explain steps of creating Presentation.
b) What is Conditional formatting? And how do you apply it?

Q.6 Answer the following questions. **16**

a) What do you mean by Bullets and Numbering? Explain with example
b) Explain Mail Merge in details.

Q.7 Answer the following questions. **16**

a) What is table in MS-Word? And explain different operations on table.
b) How can alphabetical sorting order in Microsoft word? Explain with example.

SLR-YI-15

Seat No.	

Set P

M.C.A (Semester - III) (New) (CBCS) Examination: March/April - 2025
.NET Technology (MCA01301)

Day & Date: Thursday, 15-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No. 3 to Q. No. 7
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Which of the following is not an ASP.NET page event?
a) Init b) Load
c) Import d) Disposed

2) In ASP.NET web application, configuration settings are defined in
a) PrecompiledApp.config b) machine.config
c) Web.config d) System.config

3) Which of the following webserver control used as container for other server controls in a ASP.NET webpage?
a) Placeholder b) Panel
c) Table d) Image Map

4) Which type of validation is used to check an 'email' address entered by the user is matches to email pattern?
a) RegularExpressionValidator
b) RangeValidator
c) CustomValidator
d) ValidationSummary

5) The Boolean data type _____
a) is unsigned
b) has two states
c) is displayed by the program as yes or no
d) option a and b

6) C# does not support _____ statement
a) go b) goto
c) break d) continue

7) Which is not a keyword in C# _____
a) this b) finally
c) throw d) external

8) Which protocol is used for requesting a web page in ASP.NET from the Web Server?

a) TCP b) SMTP
c) FTP d) HTTP

9) Which of the following is not a part of ASP.NET page lifecycle?

a) Start b) Load
c) Page Response d) Rendering

10) Which term is used for pages that depend on the Master page?

a) Content Pages b) Sub master page
c) web page d) none of these

B) State true or false: **06**

1) ASP.Net web application can run without web.config file
2) Check Box is an ASP.NET Client-Side control
3) We can create a hyperlink using an <a> HTML tag
4) Cookies are stored in Hard Drive
5) <radio> tag is used in HTML to create radio button
6) ASP.Net is built on the CLR.

Q.2 Answer the following question **16**

a) Features of C#
b) Explain dealing with Post Backs in brief.
c) Difference between ASP and ASP.NET
d) Write short note on nesting of master page.

Q.3 Answer the following question **16**

a) Explain Visual studio IDE in detail.
b) Explain looping statements with example.

Q.4 Answer the following question **16**

a) Explain the different server controls in ASP.NET
b) Explain ASP.NET Page life cycle events.

Q.5 Answer the following question **16**

a) Explain ASP.NET Page life cycle.
b) Explain in brief ASP.NET directives.

Q.6 Answer the following question **16**

a) Explain client-side validation and server-side validation.
b) Explain state management in ASP.NET

Q.7 Answer the following question **16**

a) Explain CLR, CLS, CTS in brief.
b) Explain in brief ASP.NET Web parts.

SLR-YI-16

Seat No.	

Set P

M.C.A (Semester - III) (New) (CBCS) Examination: March/April - 2025
Digital Image Processing (MCA01302)

Day & Date: Saturday, 17-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No.3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives: **10**

1) The process of digitizing the co-ordinate values is called___.
a) Coloring b) Compression
c) Sampling d) Restoration

2) *M* in *M x N* digital image is number of ____.
a) Pixels b) Gray levels
c) Rows d) Columns

3) The derivatives of a digital function are defined in terms of ____.
a) Differences b) Division
c) Addition d) Multiplication

4) An image is considered to be a function of $f(x, y)$ where f represents ____.
a) height of image b) width of image
c) amplitude at x, y d) no. of pixels

5) Dilation followed by erosion is called ____.
a) Opening b) Compressing
c) Closing d) Translation

6) Which of the following mask is used to find horizontal lines in an image?
a) [-1 -1 -1; 2 2 2; -1 -1 -1] b) [2 -1 -1; -1 2 -1; -1 -1 2]
c) [-1 2 -1; -1 2 -1; -1 2 -1] d) [-1 -1 2; -1 2 -1; 2 -1 -1]

7) The Second Order Derivative of Image Sharpening is called ____
a) Gabor b) Gaussian
c) Euclid d) Laplacian

8) Addition of all components in normalized histogram is equal to ____.
a) 255 b) 1
c) -1 d) 0

9) Negative of image having intensity value in the range [0, L-1] is expressed *by* ____.

a) s = L*1 b) s = L+1+r
c) s=1+r d) s = L-1-r

10) The dominant application of imaging in the microwave band is ____.

a) Radar b) Satellite
c) MRI d) None of these

B) State whether true or false: **06**

a) Images of blood vessels can be obtained using angiography.
b) Creation of new pixels in digital image is the first step in zooming.
c) One of the applications of erosion is for bridging gaps in images.
d) Segmentation is to subdivide an image into its constituent regions or objects.
e) Two structuring elements are required for the Hit-or-Miss transformation.
f) DFT stands for Discrete Fourier Transform.

Q.2 Write short answers. **16**

a) Dilation operation
b) Notch filter
c) Neighbors of pixel
d) Boundary extraction

Q.3 Answer the following:

a) What are the steps involved in filtering in the frequency domain? **08**
b) Describe morphological opening and closing. **08**

Q.4 Answer the following:

a) What are the components of digital image processing system? **08**
b) What is electromagnetic spectrum? Explain any three fields that use digital image processing. **08**

Q.5 Answer the following:

a) Explain the Hit-or-Miss transformation. **08**
b) What are the three basic types of gray-level transformations? Describe. **08**

Q.6 Answer the following:

a) Explain image segmentation. Explain point detection and line detections. **08**
b) Explain in detail thresholding, region growing and merging. **08**

Q.7 Answer the following:

a) What do you mean by smoothing spatial filters? Explain. **08**
b) Explain zooming and shrinking of digital images. **08**

Seat No.	

Set **P**

M.C.A (Semester - III) (New) (CBCS) Examination: March/April – 2025
Mobile Computing (MCA01303)

Day & Date: Monday, 19-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are Compulsory.
2) Attempt any 3 questions from Q.No.3 to Q.No.7.
3) Figures to the right indicates full marks.

Q.1 A) Choose correct alternatives. **10**

1) Which of the following statements about the Full Duplex is correct?
   a) It is a type of communication in one direction
   b) It is a type of communication in one direction at a time
   c) It is a type of bi-directional communication
   d) None of the above

2) Which one of the following can help in avoiding the interferences between the neighboring base station?
   a) Assigning different group of channels
   b) Using transmitters with the different power level
   c) Using different antennas
   d) All of the above

3) BSC comes under which of the following category?
   a) Operation b) Radio
   c) Network d) Mobile

4) Which one of the following is considered as the GSM supplementary service?
   a) Emergency number b) SMS
   c) Call forwarding d) All of the above

5) Mobile Computing allows transmission of data from one wireless-enabled device to another _____.
   a) Any device b) Wired device
   c) Wireless-enabled device d) One of the above

6) Which of the following can be considered as the advantage of using frequency reuse?
   a) The same spectrum can be allocated to the other networks
   b) Only a limited spectrum is required
   c) Increase capacity
   d) All of the above

7) Which of the following is a functionality associated with Station Management in 802.11 protocol architecture _____.
   a) Modulation, coding
   b) Channel selection, MLB
   c) Coordination of all management functions
   d) Access mechanisms, fragmentation, encryption

8) Which of the following is not a Distribution System Services (DSS)?
   a) Association b) Disassociation
   c) Authentication d) Integration

9) Android component that manages appearance and format on screen is called _____.
   a) fragment b) intent
   c) view d) layout

10) Which of the following functionalities are provided by Linux kernel?
   a) Device drivers
   b) Memory management
   c) Process management & networking
   d) All of these

B) Fill in the blanks. **06**

1) The term “VLR” stands for the _____.
2) Users of a communication system can only exchange data through the transmission of _____.
3) For _____ hopping systems, the transmitter changes the frequency several times during the transmission of a single bit.
4) On _____ kernel is Android-based on.
5) In android all the layout classes are subclasses of _____.
6) An interconnected collection of piconet is called _____.

Q.2 Answer the following. **16**

a) Explain the multipath Propagation in wireless transmission.
b) Write about the CSMA/CD.
c) Write a short note on Roaming.
d) Explain the Discovering and Bonding with Bluetooth Devices.

Q.3 Answer the following. **16**

a) Explain the different radio interfaces used in the GSM System.
b) Explain SDMA with an example.

Q.4 Answer the following. **16**

a) Write in details about the Cellular System in the Wireless Transmission.
b) Explain the Mobile Terminated Call (MTC) with its flow.

Q.5 Answer the following. **16**

a) What is DHCP? Explain how does it works.

b) Explain Snooping TCP.

Q.6 Answer the following. **16**

a) Explain format of an IEEE 802.11 frame using DSSS.

b) Explain the different ranges of signal propagation in wireless transmission.

Q.7 Answer the following. **16**

a) Explain different layouts used in Android Application development.

b) Write in details about simple Bluetooth Pico-net.

SLR-YI-18

Seat No.	

Set P

M.C.A (Semester - III) (New) (CBCS) Examination: March/April - 2025
Artificial Intelligence (MCA01304)

Day & Date: Saturday, 24-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives from the given options. 10

1) In Artificial Intelligence, knowledge can be represented as _____.
a) Predicate Logic b) Propositional Logic
c) Both a & b d) None of the above

2) What does Al stands for?
a) Automated Integration b) Artificial Intelligence
c) Artificial Investigation d) Advanced Integration

3) What type of knowledge is represented by facts and rules?
a) Procedural knowledge b) Declarative knowledge
c) Experiental knowledge d) Implicit knowledge

4) Which of the following is an example of Al in everyday life?
a) Voice assistants Like Siri or Alexa
b) Non-digital Clocks
c) Standard calculators
d) Printed Books

5) _____ a frame in knowledge representation typically consists of.
a) A set of rules b) Slots and fillers
c) A directed graph d) A list of keywords

6) _____ is the primary purpose of knowledge representation in AI.
a) To enhance computational speed
b) To store data efficiency
c) To enable machines to understand and manipulate information
d) To improve user interface design

7) In Bayesian Networks, the nodes represent _____.
a) Probabilities of different outcomes.
b) Logical rules or conditions.
c) Variables and their conditional dependencies.
d) Possible actions or outcomes in decision-making.

8) Which of the following is true about fuzzy logic?
   a) Fuzzy logic deals with crisp, binary true/false values.
   b) Fuzzy logic operates by associating a degree of truth between 0 and 1 to concepts.
   c) Fuzzy logic only works in Boolean algebra.
   d) Fuzzy logic eliminates the need for probability calculations.

9) One of the main challenges in knowledge acquisition for expert systems is _____.
   a) Ensuring that the system can interpret vague or ambiguous inputs.
   b) Gathering relevant data in real-time.
   c) Getting domain experts to articulate their knowledge in a way that can be formalized.
   d) Designing the user interface of the system.

10) In a frame-based knowledge representation, a frame is _____.
   a) A temporal model that represents changes over time.
   b) A set of relations between different objects.
   c) A data structure containing a collection of slots that define properties of an object.
   d) A list of possible actions an agent can perform

B) State True or False. **06**

1) Search algorithms are designed to explore problem spaces to find solutions to Al problems.
2) Knowledge representation involves organizing and structuring information for reasoning and inference.
3) In predicate logic, functions cannot be used to represent relationships between entities.
4) Backward reasoning starts with the goal and works backward to identify the required conditions.
5) Expert systems represent domain knowledge through rules, frames, and semantic networks, enabling the system to make decisions.
6) In a frame, each slot can contain only a single value, similar to a variable in a traditional programming language.

Q.2 Answer the following short notes. **16**

a) Constraint Satisfaction
b) Knowledge Acquisition.
c) Forward reasoning.
d) Bayesian Networks.

Q.3 Answer the following.

a) Explain Best-First Search algorithm in detail **08**
b) Explain different knowledge representation types in detail? **08**

Q.4 Answer the following.

a) Explain difference between Procedural and Declarative Knowledge. **08**

b) What is Production System and Explain Characteristics of Production System. **08**

Q.5 Answer the following.

a) Describe Bayesian Networks and explain their application in decision-making. **08**

b) How do frames help to represent structured knowledge about objects or concepts? **08**

Q.6 Answer the following.

a) Provide examples where fuzzy logic is applied in real-world systems. **08**

b) Explain Dempster-Shafer Theory (DST) and its use in handling uncertain information. **08**

Q.7 Answer the following.

a) What are the advantages of depth-first and breadth-first search? **08**

b) Discuss how domain knowledge is represented and used in expert systems. **08**

Seat No.	

Set **P**

M.C.A (Semester - III) (New) (CBCS) Examination: March/April - 2025
Data Mining and Warehouse (MCA01307)

Day & Date: Monday, 26-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question 1 and 2 are compulsory.
2) Attempt any three from Q. 3 to Q. 7.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) AGNES stands for
a) AGlomerative Next Searching
b) AGglomerative NESting
c) Advanced Group NESting
d) Advanced Group Next Search

2) The class label of each training tuple is not known, and the number or set of classes to be learned may not to be learned may not be known in advance is known as:
a) Unsupervised learning
b) self learning
c) supervised learning
d) true learning

3) Association rules that involve two or more dimensions or predicates can be referred to as
a) Single dimensional association rules
b) Multidimensional Association rules
c) Hybrid-dimensional Association rules
d) unique dimensional rule

4) _____include concept description, association, classification, prediction and clustering
a) Kinds of Knowledge
b) Task Relevant data
c) Background Knowledge
d) Interestingness measure

5) _____ , which sorts, summarizes, consolidates, computes views, checks integrity, and builds indices and partitions
a) Refresh Data
b) Data Cleaning
c) Load
d) Data Extraction

6) An _____ collects all of the information about subjects spanning the entire organization
a) Enterprise warehouse
b) Data Mart
c) Virtual warehouse
d) Refresh

7) The _____ operation define a sub cube by performing a selection on two or more dimensions

a) Slice b) Drill-down
c) Pivot (rotate) d) Dice

8) _____ , which detects errors in the data and rectifies them when possible.

a) Refresh Data b) Data Transformation
c) Data Cleaning d) Data Extraction

9) _____ in which the data warehouse contains a large central table and a set of smaller attendant tables, one for each dimension

a) Snowflake schema b) star schema
c) Fact constellation schema d) hybrid schema

10) _____ is a subjects-oriented, integrated, time-variant, non-volatile collection of data in support of management's decision making process

a) Data Mining b) Text Mining
c) Document Mining d) Data Warehouse

B) Fill in the blank. **06**

1) A data warehouse is usually constructed by integrating multiple heterogeneous sources.
2) An OLTP system is market-oriented and is used for data analysis by knowledge workers, including managers, executives, and analysts.
3) The Access patterns of an OLTP system consist mainly of short, atomic transactions.
4) An OLTP system manages current data that, typically, are too detailed to be easily used for decision making.
5) Virtual warehouse is a set of views over operational databases.
6) The 0-D cuboid, which holds the highest level of summarization, is called the base cuboid.

Q.2 Answer the following short notes. **16**

a) What is supervised learning? Explain with example.
b) What do you mean by Data Transformation? Explain in short.
c) What is data cleaning? Explain the strategies to clean the data.
d) Explain Multilevel association rule.

Q.3 Answer the following.

a) What is Data mining? Explain 'Task relevant Data' as a primitive. **08**
b) Explain four major types of concept hierarchies. **08**

Q.4 Answer the following.

a) What is Data Warehouse? Explain the difference between OLAP and OLTP. **08**

b) Explain Three-tier Data warehouse architecture with well labelled diagram. **08**

Q.5 Answer the following.

a) What is cluster analysis? Explain the requirements of clustering in data mining. **08**

b) Explain K-medoid method with example. **08**

Q.6 Answer the following.

a) What is Association Rule? Explain Aprori algorithm with suitable example. **08**

b) What is Classification? Explain Bayesian classification with example. **08**

Q.7 Answer the following.

a) What is Data Science? Explain the difference between Data Analytics and Data Science. **08**

b) Explain New trends in Data Mining. **08**

Seat No.	

Set P

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April - 2025
.NET Technology (MCA301)

Day & Date: Thursday, 15-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q.No.1 and Q. No.2 are compulsory.
2) Attempt any 3 questions from Q.No.3 to Q.No.7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Which of the following is a valid data type in ASP.NET?
a) int b) long
c) double d) all of these

2) Which of the following is not a valid event in an ASP.NET web page lifecycle?
a) Init b) End
c) PreInit d) PostInit

3) Which of the following tag is used for the HTML checkbox?
a) <check> b) <checkbox>
c) <input> d) None of these

4) The session ID's are stored in ____ by ASP.Net
a) Cache b) Server
c) Database d) Cookies

5) The first event triggers in an aspx page is ____.
a) Page_load() b) Page_click()
c) Page_In() d) Page_Init()

6) The main function of ____ is to convert the managed code into native code and then execute the code.
a) FCL b) CTS
c) CLR d) CLS

7) What is the return type of "IsPostBack" property?
a) Intger b) Boolean
c) Float d) All of these

8) The ____ is responsible for allocating, freeing and compacting memory.
a) type checker b) garbage collector
c) code manager d) memory manager

9) ____ ensures complete interoperability among applications, regardless of the language used to create the application.

a) FCL b) CLR
c) CLS d) CTS

10) ____ describes how types are declared, used and managed in the runtime.

a) CTS b) FCL
c) CLR d) CLS

B) State true or false **06**

1) "panel" webserver control used as container for other server controls in a ASP.NET webpage.
2) 'Import' is not an ASP.NET event.
3) File extension of webservices in ASP.NET is '.aspx'
4) In ASP.NET client-side validation is possible with HTML5.
5) 'FTP' is used to transfer files from localhost to remote host.
6) ASP.NET does not support ADO.NET

Q.2 Answer the following questions. **16**

a) Explain in brief features of C#
b) Write a short note on HTTP handler
c) Write difference between ASP and ASP.NET
d) Write a short note on MSIL.

Q.3 Answer the following questions. **16**

a) What is master page? Explain master page events.
b) What are ASP.NET directives? Explain page directives.

Q.4 Answer the following questions. **16**

a) Explain state management in ASP.NET
b) Explain in brief ASP.NET web parts along with its advantages.

Q.5 Answer the following questions. **16**

a) Explain the different components of visual studio IDE.
b) Explain in brief CLR, CLS, & CTS.

Q.6 Answer the following questions. **16**

a) Explain ASP.NET page life cycle.
b) Explain the looping statements with example.

Q.7 Answer the following questions. **16**

a) Explain the different server controls in ASP.NET
b) Explain ASP.NET page Life Cycle events.

SLR-YI-22

Seat No.	

Set P

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April - 2025
Digital Image Processing (MCA302)

Day & Date: Saturday, 17-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 questions from Q. No.3 to Q. No. 7.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives: **10**

1) What is the first step in the process of image processing?
a) Segmentation b) Image acquisition
c) Image enhancement d) Image restoration

2) At what points, a continuous image is digitized?
a) Sampling b) Vertex
c) Contour d) Random

3) What is the name of the tool that helps in zooming, shrinking, rotating, etc.?
a) Filters b) Interpolation
c) Sampling d) None of the above

4) Which of the following possess maximum frequency?
a) Gamma Rays b) UV Rays
c) Microwaves d) Radio waves

5) If each element of set X is also an element of set Y, then X can be called _____of set Y.
a) Union b) Subset
c) Disjoint d) Complement Set

6) Median filters belong to which category of filter?
a) Frequency Domain Filter b) Order Statistics Filter
c) Linear Spatial Filter d) Sharpening Filter

7) Given an intensity level [0, L-1] with "r" and "s" positive values, how will the negative of an image obtain?
a) s = L -1 – r b) s = L - 1 + r
c) s = L + 1 – r d) s = L + 1 + r

8) Which of the following filter is used to find the brightest point in the image?
a) Max filter b) Mean filter
c) Median filter d) None of the above

9) ____ attempts to reconstruct an image that has been degraded by using prior knowledge of the degradation phenomenon.

a) Image Display b) Image Restoration
c) Image Compression d) Image Zooming

10) Image segmentation algorithms generally are based on _____ properties of intensity values.

a) Discontinuity b) Similarity
c) discontinuity or similarity d) none of these

Q.1 B) State whether true or false: **06**

a) The morphological closing of set A by B is dilation followed by erosion.
b) Spatial domain processing techniques of image enhancement are based on modifying the Fourier transform of an image.
c) In an image represented by $f(x, y)$ the values x, y and f are all finite.
d) A band pass filter performs the opposite operation of a band reject filter.
e) The difference between two images $f(x, y)$ and $h(x, y)$ is obtained by computing the difference between all pairs of corresponding pixels from f and h.
f) Erosion followed by dilation is called opening operation.

Q.2 Write short answers. **16**

a) Min and Max filter
b) Power law transformation
c) Boundary extraction
d) Median filter

Q.3 Answer the following:

a) Explain Histogram Processing, Histogram Equalization. **08**
b) What are the steps involved digital image processing? **08**

Q.4 Answer the following:

a) Discuss different mean filters. **08**
b) Draw the degradation model and explain. **08**

Q.5 Answer the following:

a) Describe 4-connectivity, 8-connectivity and m-connectivity. **08**
b) Explain any three noise models. **08**

Q.6 Answer the following:

a) What is segmentation? What are the three types of discontinuity in digital image? **08**
b) What are the steps involved in filtering in the frequency domain? **08**

Q.7 Answer the following:

a) Explain the Hit-or-Miss transformation. **08**

b) Explain following terms Opening and Closing with example. **08**

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Set P

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April – 2025
Mobile Computing (MCA303)

Day & Date: Monday, 19-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are Compulsory.
2) Attempt any 3 questions from Q.No.3 to Q.No.7.
3) Figures to the right indicates full marks.

Q.1 A) Choose correct alternatives. **10**

1) In the Cellular Network, on which of the following, the cell's shape depends?
   a) Political conditions b) Social Conditions
   c) Environment Condition d) None of the above

2) In which one of the following, the slow and fast hopping is used?
   a) GSM b) GPRS
   c) FHSS d) None of the above

3) Which of the following is a fundamental principle of wireless communication?
   a) Electromagnetic waves b) Microwaves
   c) Both a and b d) None of the above

4) How many sub-systems are Global Systems for Mobiles?
   a) 4 b) 3
   c) 2 d) None of the above

5) In which of the following, the single-channel has the ability to carry all transmissions simultaneously?
   a) In the Code Division, Multiple Access (or CDMA)
   b) In the Time Division Multiple Access (or TDMA)
   c) In the Frequency Division Multiple Access (or FDMA)
   d) None of the above

6) The term _____ refers to transporting a mobile station from one base station to another base station.
   a) Roamer b) Forward channel
   c) Handover d) MIN

7) IEEE 802.11 standard is for?
   a) Wireless LAN b) Bluetooth
   c) Wi-Fi d) Wi-MAX

8) In mobile IP the _____ procedure the mobile node informs its home agent of its care-of address.
   a) Discovery b) Registration
   c) Tunneling d) Termination

9) Which of the MAC Management function allow the station to switch the system to low power or to turn off the power?
   a) Synchronization b) Power Management
   c) Roaming d) None of mentioned

10) Which of the following converts Java byte code into Dalvik byte code?
   a) Dalvik converter
   b) Dex compiler
   c) Mobile interpretive compiler (MIC)
   d) None of the above

B) Fill in the blanks. **06**

1) APK in android stands for _____.
2) Baud rate is equal to _____.
3) _____ service offers larger message size i.e. 760 characters, formatted text, image, ringtone etc.
4) The Care-of address (COA) defines the current location of the _____ from the IP Point of view.
5) _____ is the heart of the GSM system.
6) _____ layer is the lowest layer of android architecture.

Q.2 Answer the following. **16**

a) Write the Applications of Wireless LAN.
b) Write note on Cellular system.
c) Explain Hidden and exposed Terminals.
d) Write about the different Priority of Processes in Android Application.

Q.3 Answer the following. **16**

a) Write the difference between Classical Aloha and Slotted Aloha.
b) Explain in detail the spread spectrum- DSSS.

Q.4 Answer the following. **16**

a) Explain the architecture of the Bluetooth.
b) Write in detail about the Inter-MSC Handover used in the telecommunication system.

Q.5 Answer the following. **16**

a) Explain the format of an IEEE 802.11 frame using DSSS.
b) Explain network Signaling in Wireless Transmission.

Q.6 Answer the following. **16**

a) Explain IP in IP Encapsulation.
b) Explain IP Packet delivery to and from the mobile node.

Q.7 Answer the following. **16**

a) Explain different layouts used in android applications.

b) Explain the Indirect TCP.

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Set P

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April - 2025
Artificial Intelligence (MCA304)

Day & Date: Saturday, 24-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question 1 and 2 are compulsory.
2) Attempt any three from Q. 3 to Q. 7.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Which of the following algorithm related to Artificial Intelligence?
   a) Routing Algorithm b) Greedy Algorithm
   c) Hill Climbing Algorithm d) Recursive Algorithm

2) The “Father of Artificial Intelligence” is: _____.
   a) Alan Turing b) John McCarthy
   c) Charles Babbage d) None of these

3) A _____ representation is one in which knowledge is specified but the use to which that knowledge is to put is not given.
   a) Procedural b) Baye’s
   c) Declarative d) Semantic net

4) A* algorithm is based on _____.
   a) Breadth-First-Search b) Depth-First-Search
   c) Uniform Cost Seach d) Best-First-Search

5) In artificial Intelligence, knowledge can be represented as _____.
   a) Predicate Logic b) Propositional Logic
   c) Both a & b d) None of the these

6) Inference engine work on the principle of?
   a) Backward Chaining b) Forward Chaining
   c) Both a & b d) None of these

7) _____ of the following is a component of an expert system.
   a) Inference engine b) User interface
   c) Knowledge base d) All of the these

8) On which of the following approaches a basic line following robot is based?
   a) Applied approaches b) Weak Approach
   c) Strong Approach d) Cognitive Approach

9) A _____ is a collection of attributes and associated values that describes some entity in the world.
   a) Frames b) Script
   c) Conceptual dependency d) Semantic net

10) Which of the following search method takes less memory space?
   a) Depth First Search b) Breadth -First Search
   c) Linear Search d) Optimal Search

B) Fill in the blank. **06**

1) An Al technique refers to a specific method used to solve problems, such as algorithms, rules, or _____.
2) A _____ system consists of a set of rules, a knowledge base, and an inference engine that manipulates the rules to generate conclusions.
3) Common approaches to knowledge representation include logic, semantic networks, and _____.
4) Predicate logic uses _____ to represent relationships between objects and entities, allowing for formal reasoning.
5) In _____, concepts are represented as nodes and relationships between them are represented as edges.
6) An _____ is a software framework that provides tools for building expert systems without the need for extensive programming.

Q.2 Answer the following short notes. **16**

a) Production system
b) Instance and ISA Relationships
c) Frames
d) Bayesian Networks

Q.3 Answer the following.

a) Explain Depth-First Search algorithm in detail. **08**
b) What is Artificial Intelligence? Explain Al Technique? **08**

Q.4 Answer the following.

a) Explain Procedural verses Declarative knowledge in A.I. **08**
b) Explain Certainty Factors and Rule based system in detail. **08**

Q.5 Answer the following.

a) Explain Dempster-Shafer theory with example. **08**
b) What is Production System? Explain its Characteristics. **08**

Q.6 Answer the following.

a) Differentiate between DFS and BFS. **08**
b) Explain the Minmax search algorithm. **08**

Q.7 Answer the following.

a)	Explain Bayes' theorem and its application in probabilistic reasoning.	**08**
b)	What are Semantic Networks, and how are they used in knowledge representation?	**08**

Seat No.	

Set **P**

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April - 2025
Data Mining and Warehouse (MCA307)

Day & Date: Monday, 26-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question 1 and 2 are compulsory.
2) Attempt any three from Q. 3 to Q. 7.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) The full form of OLTP is
   a) Online Transaction Processing
   b) Online Transfer Processing
   c) Online Transport Preparation
   d) Online Transportation Performance

2) An____system is customer-oriented and is used for transaction and query processing
   a) OLAP
   b) OLTP
   c) OLEP
   d) none of these

3) An_____typically adopts either a star or a snowflake model
   a) OLAP
   b) OLEP
   c) OLTP
   d) none of these

4) The schema is a variant of the star schema model.
   a) Snowflake schema
   b) star schema
   c) Fact constellation schema
   d) hybrid schema

5) ____is a subjects-oriented, integrated, time-variant, non-volatile collection of data in support of management's decision making process.
   a) Data Mining
   b) Text Mining
   c) Document Mining
   d) Data Warehouse

6) _____it navigates from less detailed data to more detailed data
   a) Roll-up
   b) Drill-down
   c) drill-rotate
   d) Rule-up

7) An collects all of the information about subjects spanning the entire organization
   a) Enterprise warehouse
   b) Data Mart
   c) Virtual warehouse
   d) Refresh

8) _____ , which converts data from legacy or host format to warehouse format
   a) Refresh Data b) Data Transformation
   c) Data Cleaning d) Data Extraction

9) Concept hierarchy is a powerful form of
   a) Task Relevant data b) Kinds of Knowledge
   c) Background Knowledge d) Interestingness measure

10) The class label of each training tuple is not known, and the number or set of classes to be learned may not to be learned may not be known in advance is known as:
   a) Unsupervised learning b) self learning
   c) supervised learning d) None of these

B) Fill in the blank. **06**

1) A data warehouse is organized around major subjects such as customer, suppliers, product and sales.
2) An OLAP system is customer-oriented and is used for transaction and query processing by clerks, clients, and information technology professionals.
3) An enterprise warehouse collects all of the information about subject spanning the entire organization.
4) Refresh, which propagates the updates from the data sources to the warehouse.
5) pivot is also called roll-up
6) metadata are data about data

Q.2 Answer the following short notes. **16**

a) What is supervised learning? Explain with example
b) Explain Multilevel association rule.
c) Explain the strategies to fill missing values.
d) What do you mean by Data Transformation? Explain in short.

Q.3 Answer the following.

a) What is Data mining? Explain 'Background knowledge' as a primitive. **08**
b) Explain four major types of concept hierarchies **08**

Q.4 Answer the following.

a) What is Data Warehouse? Explain the difference between OLAP and OLTP. **08**
b) Describe Data warehouse architecture with well labelled diagram. **08**

Q.5 Answer the following.

a) What is Cluster Analysis? Explain different types cluster analysis **08**
b) Explain K-means algorithm with suitable example. **08**

Q.6 Answer the following.

a)	Explain Aproari algorithm with example.	**08**
b)	What is Classification? Explain decision tree induction method with example.	**08**

Q.7 Answer the following.

a)	Explain typical OLAP operations.	**08**
b)	Explain different Applications of Data Mining.	**08**

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Seat No.	

Set P

M.C.A (Semester - III) (Old) (CBCS) Examination: March/April - 2025
Finite Automata (MCA308)

Day & Date: Monday, 26-May-2025 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Questions 1 and 2 are compulsory.
2) attempt any three from Q. No. 3 to Q. No. 7.
3) Figure to the right indicates full marks.

Q.1 A) Choose correct alternative (MCQ) **10**

1) There are only a finite number of ____, the entire history generally cannot be remembered.
a) Calculation b) Capacitors
c) Semiconductor d) State

2) The '*' star represents " ____ " the preceding expression.
a) Many numbers of b) Any number of
c) Single number of d) Multi number of

3) ____ do not have to be so wordy. Having seen the ideas behind the proof.
a) Theorem b) Proof
c) Idea d) Inputs

4) A set equality, ____ as an element X is in E if and only if X is in F.
a) E&&F b) E<=F
c) E!=F d) E=F

5) In languages, ____ is a subset of ASCII.
a) String b) Alphabet
c) Variable d) Meta language

6) Classify strings by their ____, the number of positions for symbols in the string.
a) Centimeter b) Set
c) Length d) Lambda

7) Conventionally, the symbol $\sum = \{0,1\}$ denotes ____ alphabet.
a) Binary b) Quadra
c) Tertiary d) Empty

8) ____ distinguish tractable problems from intractable problems.
a) Turing Machines b) Machine
c) Mechanical Machines d) Hydraulic Machines

9) Context free grammars are an important notation for describing the structure of ____ languages.

a) Parametric b) Programming
c) Non parametric d) Natural

10) ____ means that the automaton can be in several states at once.

a) Nondeterministic b) Determinant
c) Conditioned d) Non-Concurrent

B) State True False: **06**

a) Regular languages are exactly the ones that can be described by finite automata.
b) Deterministic finite automaton is often referred as DFA.
c) The regular expression do not denote languages.
d) The Closure of languages is a set of strings that can be formed by talking any string and concatenating it with any string.
e) Lower case letters near the end of alphabet is called terminals.
f) Any derivation has an equivalent leftmost and an equivalent rightmost derivation.

Q.2 Answer the following: **16**

a) Define Turing Machine?
b) What is Closure in Automata?
c) Define Pumping Lemma?
d) What do you mean by Regular Expression?

Q.3 Answer the following: **16**

a) State the meaning of Pushdown Automata? Explain and Differentiate between DPDA (Deterministic Pushdown Automata) and NPDA (Non-deterministic Pushdown Automata)?
b) What is Epsilon Transition? State the difference between NFA with epsilon and without epsilon?

Q.4 Answer the following: **16**

a) Discuss in detail the concept and uses of Parse Tree in Compiler Design?
b) What do you mean by Regular Expression? Explain in detail regular expressions and finite automata?

Q.5 Answer the following: **16**

a) Discuss in detail various Closure Properties of Regular languages?
b) What is CGFs? Explain in detail the normal form of Context Free Grammar?

Q.6 Answer the following: **16**

a) Discuss in detail DFA to design FA with $\sum = \{0, 1\}$ accepts even number of 0's and even number of 1's?
b) Explain in detail Equivalence of Pushdown Automata with Context-Free Grammar with suitable example?

Q.7 Answer the following: **16**

a) Define Restricted Turing Machine. State and explain in detail various types of Restricted Turing Machine?

b) State and explain in detail NFA to design an NFA with $\sum = \{0, 1\}$ in which double ‘1’ is followed by double '0'?