Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: October/November - 2025
Objects Oriented Programming using C++ (2318101)

Day & Date: Wednesday, 29-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative for the following. **08**

1) Which of the following is not correct for virtual function in C++?
   a) Virtual function can be static
   b) Virtual function should be accessed using pointers
   c) Virtual function is defined in base class
   d) Must be declared in public section of class

2) How can we make a class abstract?
   a) By declaring it abstract using the static keyword
   b) By declaring it abstract using the virtual keyword
   c) By making at least one member function as pure virtual function
   d) By making all member functions constant

3) How many specifiers are present in access specifiers in class?
   a) 2 b) 1
   c) 4 d) 3

4) Which of these following members are not accessed by using direct member access operator?
   a) Public b) Private
   c) Protected d) Both b & c

5) Who invented C++?
   a) Dennis Ritchie b) Ken Thompson
   c) Brian Kernighan d) Bjarne Stroustrup

6) What is C++?
   a) C++ is an object-oriented programming language
   b) C++ is a procedural programming language
   c) C++ supports both procedural and object-oriented programming language
   d) C++ is a functional programming language

7) Which of the following is the correct syntax of including a user defined header files in C++?
   a) #include [userdefined] b) #include "userdefined"
   c) #include <userdefined.h> d) #include <userdefined>

8) Which of the following is used for comments in C++?
   a) /* comment */
   b) //comment */
   c) // comment
   d) both // comment or /* comment */

B) Fill in the blanks. **04**

1) Each byte in memory is assigned a unique _____.
2) The _____ operator can be used to determing a variable's address.
3) _____ variables are designed to hold addresses.
4) Under older compilers, if the new operator cannot allocate the amount of memory requested, it return _____.

Q.2 Answer the following. (Any Six) **12**

a) Define Encapsulation and Data hiding.
b) Define Data members and member function.
c) What do you mean by a token?
d) Differentiate between keyword and identifier.
e) Define memory allocation in cpp.
f) Define Static Member Function.
g) What is Prefix Increment & Decrement Operation?
h) Define constructor.

Q.3 Answer the following. (Any Three) **12**

a) Write down the syntax and example to create a class.
b) What do you mean by operator precedence?
c) Differentiate between do..while and while loops on the basis of syntax.
d) State any four points of differentiation between compile time polymorphism and run time polymorphism.

Q.4 Answer the following. (Any Two) **12**

a) What are the features of Object-oriented programming.
b) Explain use of friend function with the help of suitable example.
c) Write a C++ program to overload area () function to calculate area of shapes like triangle, square, circle.

Q.5 Answer the following. (Any Two) **12**

a) Write a C++ program to calculate root of quadratic equations by initializing the object using default constructor.
b) Write a program to add two complex numbers using object as arguments.
c) Demonstrate hybrid inheritance with the help of suitable example.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Advanced DBMS (2318102)

Day & Date: Friday, 31-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Which type of data can be stored in the database?
   a) Audio b) Video
   c) Text d) All of the above

2) _____ command is used to remove table from database.
   a) Drop b) Delete
   c) Remove d) Cancel

3) _____ makes the transaction permanent in the database.
   a) Commit b) Rollback
   c) Update d) Save

4) In DBMS table is also known as _____.
   a) Tuple b) Domain
   c) Relation d) None of these

5) Fifth normal form is concern with _____.
   a) Domain key b) Multivalued dependency
   c) Functional dependency d) Join dependency

6) The number of attributes in relation is called as _____.
   a) Cardinality b) Degree
   c) Entity d) Tuple

7) Checkpoint are a part of _____.
   a) Security Measures b) Recovery Measures
   c) Concurrency Measures d) Authorization Measures

8) _____ is used to denote the projection operation in relational algebra.
   a) Pi b) Sigma
   c) Lambda d) Omega

B) Write True or False. **04**

1) Full form of DDL is Data Malware Language.
2) In The primary key does not necessarily have to be unique for a given table.
3) Projection Operation displays the specific column of a table.
4) Generalization is bottom-up process.

Q.2 Answer the following. (Any Six) **12**

a) Define transaction.
b) What are three levels of data abstraction?
c) What is Data Definition Language? List commands of DDL.
d) Define view.
e) Why use primary key?
f) List various operations of relational algebra.
g) Why use commit and rollback?
h) Write syntax for insert command.

Q.3 Answer the following. (Any Three) **12**

a) Explain types of users in DBMS.
b) What is database recovery? Explain different database recovery techniques.
c) Write a note on shadowing.
d) What is Exception? Explain how to handle exception with example.

Q.4 Answer the following. (Any Two) **12**

a) Write a note on Specialization and Generalization.
b) What is distributed database? Explain Client/Server architecture of distributed database.
c) Explain in and between operators with example.

Q.5 Answer the following. (Any Two) **12**

a) What is Serializability? Explain Conflict Serializability in details.
b) Explain types of data models.
c) What is trigger? How to create trigger? Explain types of trigger.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: October/November - 2025
Data Structures and Algorithms (2318107)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ in which each node has a reference to both the next and previous nodes in the list.
   a) Singly b) Priority
   c) Doubly d) One Ended

2) _____ are easy to provide because they are already built into computers language instruction set.
   a) Data types b) Program
   c) Statements d) Constants

3) In a matrix, if there are majority of _____ elements then such matrix is referred a Sparse.
   a) Non-Zero b) Zero
   c) X d) Empty

4) A Stack is an ordered list in which all insertions and deletions are made at _____ end.
   a) Two b) No
   c) One d) Some

5) A _____ is an ordered list in which all insertions take place at one end called rear.
   a) Linked List b) Queue
   c) Array d) Stack

6) The ____ of a node are all the nodes along the path from root to that node.
   a) Ancestors b) Associates
   c) Relations d) Descendents

7) In Binary tree, have two ____ branches called left and right subtree.
   a) Disjoint b) Alternate
   c) Multiple d) Single

8) Sorting algorithm is used to ____ a given array or list of elements in an order.
   a) Arrange b) Rearrange
   c) Merge d) Insert

B) Write True/False. **04**

1) Queue is needed to convert infix notation to postfix notation.
2) Stack is two ended data structure.
3) Stack data structure required for Depth First Tree Traversal.
4) For matrix multiplication, the number of columns in the first matrix must be equal to the number of rows in the second matrix.

Q.2 Answer the following (Any Six) **12**

a) What do you mean by Linked List?
b) What do you mean by Data?
c) What is LIFO?
d) What is Algorithm?
e) Define Search
f) What is Sorting?
g) Define Tree
h) What is Matrix?

Q.3 Answer the following (Any Three) **12**

a) What do you mean by Circular Linked List?
b) What do you mean by Depth First Search?
c) State and explain in brief Push, Pop operation with Top of Stack status?
d) What is Double Ended Queue?

Q.4 Answer the following (Any Two). **12**

a) Explain evaluating Postfix expression using Stack for the given expression

12	**4**	**8**	*****	**+**	**7**	**+**	**10**	**-**

b) Discuss and apply Merge Sort to state result on below given series -
Series- 4, 9, 105, 74, 10, 85, 71, 101, 876, 143, 39, 571, 24,
c) Explain in details Binary tree characteristics and various types of binary tree with suitable example?

Q.5 Answer the following (Any Two). **12**

a) State and explain in detail procedure to insert element at beginning, middle and end of Doubly Linked List with suitable example.
b) Generate Binary Search Tree of given series and state the pre-order, in-order and post-order traversing results of it.
Series- 26, 21, 85, 55, 75, 95, 17, 19, 3, 5, 20, 13, 6, 5, 1
c) Discuss various types of Queue and related Operations with suitable example?

SLR-HG-4

Seat No.	

Set P

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: October/November - 2025
Operating System (2318108)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives. **08**

1) Which of the following is not a type of operating system?
   a) Real-time b) Parallel
   c) Cloud d) Distributed

2) A system call allows a process to _____.
   a) Execute shell commands
   b) Access OS services
   c) Compile code
   d) Allocate CPU

3) Which scheduling algorithm uses a time quantum?
   a) FCFS b) SJF
   c) Priority d) Round Robin

4) The critical section problem is addressed using _____.
   a) Semaphores b) Deadlocks
   c) Paging d) Scheduling

5) Which memory management technique suffers from external fragmentation?
   a) Paging b) Segmentation
   c) Contiguous allocation d) Swapping

6) The condition that does not contribute to deadlock is ____.
   a) Mutual exclusion b) Hold and wait
   c) Circular wait d) Context switch

7) The page replacement algorithm that replaces the page not used for the longest time is _____.
   a) FIFO b) LRU
   c) Optimal d) Random

8) Which of the following command is used to change file permissions in Linux?
   a) Chmod b) chperm
   c) setperm d) perm

B) Write True/False. **04**

1) Paging leads to internal fragmentation.
2) Multilevel feedback queue can adjust process priority dynamically.
3) A semaphore is used for file system protection.
4) Thrashing occurs when CPU spends excessive time in context switching.

Q.2 Answer the following (Any Six) **12**

a) Define Operating System. Explain any three of its services.
b) What is the use of Linux Loader?
c) Explain inter-process communication.
d) What is paging? How is logical address translated into physical address?
e) What are the different file allocation methods?
f) Define semaphores. Where are they used?
g) Write a short note on system calls and their types.
h) Explain kernel and shell in Linux.

Q.3 Answer the following (Any Three) **12**

a) Compare FCFS, SJF and Round Robin scheduling with example.
b) List the major advantages of using Linux over other operating systems.
c) Explain the critical section problem and its solution.
d) Describe deadlock prevention in briefly.

Q.4 Answer the following (Any Two). **12**

a) Describe memory management techniques in detail.
b) What is demand paging? Explain any two-page replacement algorithms.
c) Describe the Linux file system structure. Give the functions of directories provided by Linux operating system.

Q.5 Answer the following (Any Two). **12**

a) Explain the role of monitors in process synchronization. How are they different from semaphores?
b) Discuss disk structure and disk scheduling algorithms.
c) What is a page replacement algorithm? Explain any one algorithm with an example.

SLR-HG-5

Seat No.	

Set P

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: October/November - 2025
Research Methodology in Computer Science (2318103)

Day & Date: Thursday, 06-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternatives. **08**

1) Basic research is also known as _____ research.
   a) Analytical b) Descriptive
   c) Fundamental d) Applied

2) _____ provide concise information on a number of subjects written by specialists.
   a) Research magazine b) Encyclopaedia
   c) News paper d) Synopsis

3) Good research is _____: This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research.
   a) Systematic b) Empirical
   c) Replicable d) Logical

4) _____ constitutes the blueprint for the collection, measurement and analysis of data.
   a) Research design b) Research problem
   c) Analysis d) Literature review

5) _____ research is based on the measurement of quantity.
   a) Applied b) Descriptive
   c) Quantitative d) fundamental

6) Good research is _____: This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decision.
   a) Systematic b) Empirical
   c) Logical d) Replicable

7) _____ research is specially important in the behavioral sciences where the aim is to discover the underlying motives of human behavior.
   a) Fundamental b) Qualitative
   c) Quantitative d) Applied

8) _____ research aims at finding a solution for an immediate problem facing a society or an industrial /business organisation.
   a) Quantitative b) Qualitative
   c) Descriptive d) Applied

B) Write True or False: **04**

1) Descriptive Research includes surveys and fact-finding enquires of different kinds.
2) Qualitative research is based on the measurements of quantity or amount.
3) A periodical is defined as a publication issued in successive part, usually at regular intervals, and as a rule, intended to be continued indefinitely.
4) A good design is often characterised by adjectives like flexible, appropriate, efficient, economical and so on.

Q.2 Answer the following (Any Six) **12**

a) What is the need of report writing?
b) What is patent?
c) Explain in short the example of Qualitative research.
d) What do you mean virtual lab?
e) What do you mean by keywords?
f) What is research proposal?
g) What is the need of sections/subsections in report?
h) What is Abstract?

Q.3 Answer the following (Any Three) **12**

a) Write a short note on Digital lab.
b) What are the parameters for evaluating the research report? Explain it.
c) Explain the procedure for making existing document into multiple columns.
d) What is e-research? Explain it.

Q.4 Answer the following (Any Two). **12**

a) What is Literature Review? Explain different objectives of literature review.
b) Define research design. Explain the features of research design.
c) What are the issues while selecting the research problem? Explain it.

Q.5 Answer the following (Any Two). **12**

a) What is research? Explain the Objectives of Research.
b) Explain the difference between quantitative and qualitative research.
c) Explain motivations in research.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - I) (CBCS) Examination: October/November - 2025
UML (MSC18110)

Day & Date: Wednesday, 29-10-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 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) Which of the following is a principle of modeling?
   a) Abstraction b) Encapsulation
   c) Polymorphism d) Inheritance

2) Which of the following diagram is used to model the dynamic behavior of a system?
   a) Class Diagram b) Use Case Diagram
   c) Sequence Diagram d) Component Diagram

3) What is the purpose of a use case diagram?
   a) To model the static structure
   b) To model the dynamic behavior
   c) To model user interactions
   d) To model data flow

4) Which of the following is a type of relationship in UML?
   a) Aggregation b) Association
   c) Composition d) All of these

5) Which diagram is used to model the flow of control from activity to activity?
   a) Sequence Diagram b) Activity Diagram
   c) State Diagram d) Use Case Diagram

6) What does a package represent?
   a) A group of classes b) A group of objects
   c) A group of components d) A group of nodes

7) Which of the following is not a phase in the software development life cycle?
   a) Inception b) Elaboration
   c) Construction d) Compilation

8) Which of the following is not a common mechanism in UML?
   a) Stereotypes
   b) Constraints
   c) Tagged values
   d) Classes

9) Stereotype means _____.
   a) A programming language
   b) A relationship type
   c) An extension mechanism to create new model elements
   d) A class diagram

10) Interfaces in UML are used to _____.
   a) Represent internal data members
   b) Define only class visibility
   c) Specify required behavior without implementation
   d) Manage database connections

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

1) An object class defines only the behavior of its objects, not their data.
2) Modeling is used in software engineering to reduce complexity and improve understanding.
3) Object-oriented modeling does not support reuse of components.
4) Object diagrams are used during implementation to model the deployment environment.
5) An activity diagram is primarily used to model the structure of the system.
6) In a collaboration diagram, message numbering indicates the sequence of messages.

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

a) Explain the object-oriented design process with an example.
b) What are the building blocks of UML?
c) Draw and explain a class diagram showing generalization and association.
d) Differentiate between Class and Object diagrams with examples.

Q.3 Answer the following.

a) What is a Use Case Diagram? Draw a use case diagram for an Online Shopping System. **08**
b) Differentiate between collaboration and sequence diagrams. **08**

Q.4 Answer the following.

a) What is the importance of modeling in object-oriented design? Explain principles of modeling. **08**
b) Define object and object class with real-world examples. **08**

Q.5 Answer the following.

a) Describe advanced class features and relationships in UML with an example. **08**

b) What is a package? Explain in detail concept of packages. **08**

Q.6 Answer the following.

a) Explain events and signals in detail. **08**

b) Describe time and space modeling in behavioral modeling. **08**

Q.7 Answer the following.

a) Explain terms and concepts of architectural modeling. **08**

b) Differentiate between component and deployment diagrams. **08**

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Java Programming (2318201)

Day & Date: Tuesday, 28-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives. **08**

1) What is the expansion of JDK?
   a) Java Deployment Kit b) Java Display Kit
   c) Java Development Kit d) Java Design Kit

2) _____ method is used to pause a thread temporarily.
   a) wait() b) pause()
   c) sleep() d) stop()

3) _____ method is called only once during the applet life cycle.
   a) init() b) start()
   c) stop() d) destroy()

4) Which of the following method is used to perform DML statements in JDBC?
   a) executeResult() b) executeQuery()
   c) executeUpdate() d) execute()

5) The AWT component used to draw graphics is _____
   a) Frame b) Button
   c) Graphics d) Canvas

6) Which of the following method will be invoked if a character is entered?
   a) keyPressed() b) keyReleased()
   c) keyTyped() d) keyEntered()

7) _____ method is used to register a keyboard event listener.
   a) KeyListener() b) addKistener()
   c) addKeyListener() d) eventKeyboardListener()

8) Which class is used to create server sockets?
   a) Socket b) ServerSocket
   c) ClientSocket d) URLConnection

B) Write True or False: **04**

1) AWT stands for Abstract Window Toolkit.
2) Custom exceptions must extend Throwable class.
3) The extension of compiled Java classes is .java.
4) ItemListener interface should be implemented to handle button clicks.

Q.2 Answer the following. (Any Six) **12**

a) Differentiate between checked and unchecked exceptions.
b) List any four main features of java.
c) List any four built-in exception classes.
d) Explain the role of the finally block in exception handling.
e) List the common methods of the Socket class in Java.
f) What the purpose of the InetAddress class in Java networking?
g) What is the difference between PreparedStatement and CallableStatement in JDBC?
h) What is the use of final keyword?

Q.3 Answer the following. (Any Three) **12**

a) Why java became platform independent language? Explain.
b) Give the applications of Java.
c) Discuss the use of static keyword.
d) What is multithreading? Explain with suitable example.

Q.4 Answer the following. (Any Two) **12**

a) Explain StringBuffer class using different methods.
b) What is constructor? Explain different types of constructors.
c) What is Layout Manager? Explain any one in detail.

Q.5 Answer the following. (Any Two) **12**

a) Write a program to copy the content of one text file into another text file.
b) What are Event Listeners? Explain any two Event Listeners interfaces.
c) Explain how interface is used to achieve multiple Inheritance with example.

SLR-HG-8

Seat No.	

Set P

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: October/November - 2025
Python Programming (2318202)

Day & Date: Thursday, 30-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives. **08**

1) The assignment of more than one function to a particular operator is _____.
   a) Operator over-assignment
   b) Operator overriding
   c) Operator overloading
   d) Operator instance

2) _____ is a model or blue print for creating objects.
   a) structures b) class
   c) variable d) method

3) Which module in Python supports regular expressions?
   a) re b) regex
   c) pyregex d) None of the mentioned

4) NumPy arrays can be _____.
   a) Indexed b) Sliced
   c) Iterated d) All of the mentioned above

5) _____ is a built-in method useful to call the super class constructor or methods.
   a) static() b) call()
   c) super() d) call_super()

6) When is the finally block executed?
   a) when there is no exception
   b) when there is an exception
   c) only if some condition that has been specified is satisfied
   d) always

7) In python function can return _____ values.
   a) only one b) o+-nly two
   c) only three d) any number of

8) _____ of the following is not a geometry management method.
   a) grid() b) place()
   c) pack() d) class

B) Fill in the blanks. **04**

1) To install pandas module _____ command is used.
2) MVC pattern is based on _____ components.
3) The ability to create new class from existing ones is called _____.
4) _____ keyword we use to fetch the data from the table in database.

Q.2 Answer the following (Any Six) **12**

a) What is data type? List out types of data types used in python.
b) What is NumPy?
c) What is set? Give an example.
d) What is a decorator? List out types of decorators.
e) What is series? Give an example.
f) What is thread synchronization?
g) What is abstract class?
h) What is button?

Q.3 Answer the following (Any Three) **12**

a) What is constructor? Explain the types of constructor with example.
b) What is list? Explain the methods of list with example.
c) What is exception handling? Explain with example.
d) What is DataFrame? Explain the sorting and ranking with example.

Q.4 Answer the following (Any Two). **12**

a) What is matplotlib? Explain the box plot and line plot.
b) Create 3D NumPy array and perform following operations.
   i) Indexing
   ii) Slicing
c) Create a python program to demonstrate communication between threads using wait() and nitify() methods.

Q.5 Answer the following (Any Two). **12**

a) Explain the frame and check button.
b) What is inheritance? Explain the types of inheritance with example.
c) Explain the Django template to create a template, modify view and change setting.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: October/November - 2025
Computer Communication Network (2318207)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives. **08**

1) _____ framing method is not suitable for Unicode characters.
   a) Character Count b) Byte Stuffing
   c) Bit stuffing d) Physical code violation

2) The first Network is _____.
   a) CNNET b) NSFNET
   c) ASAPNET d) ARPANET

3) physical layer provides _____.
   a) mechanical specifications of electrical connectors and cables
   b) electrical specification of transmission line signal level
   c) specification for IR over optical fiber
   d) all of these

4) Minimum size of a UDP datagram would be _____.
   a) 4 bytes b) 8 bytes
   c) 20 bytes d) 28 bytes

5) _____ is a program that accepts a variety of commands for composing, receiving, and replying to messages in E-mail.
   a) Mail transfer agent b) User agent
   c) Mail receiver agent d) None of the mentioned

6) Routing tables of a router keeps track of _____.
   a) MAC address Assignments
   b) Port assignments to network devices
   c) Distribute IP address to network devices
   d) Routes to use for forwarding data to its destination

7) Which protocol handles errors by retransmitting only specific frames rather than the entire window?
   a) Stop-and-Wait ARQ
   b) Go-Back-N ARQ
   c) Selective Repeat ARQ
   d) Automatic Repeat Request (ARQ)

8) In TDM, slots are further divided into _____.
   a) Seconds b) Frames
   c) Packets d) None of the these

B) Fill in the blanks. **04**

1) IPV4 Address is _____.
2) In cyclic redundancy checking, the CRC is _____.
3) _____ protocol is used for transferring dynamic web pages over the internet.
4) _____ protocol is used for real-time transmission of multimedia data.

Q.2 Answer the following (Any Six) **12**

a) What is DNS?
b) What is jitter?
c) What is wireless LAN?
d) What is piggybacking?
e) What is ARPANET?
f) How does a single bit error differ from a burst error?
g) What is an optimality principle?
h) Which are the various flags in TCP?

Q.3 Answer the following (Any Three) **12**

a) Explain the architecture of Internet.
b) Explain hamming code in detail.
c) Explain congestion control in datagram subnet.
d) Explain HTTP in short.

Q.4 Answer the following (Any Two). **12**

a) What is QoS. Explain the techniques for achieving Good Quality of Service.
b) Explain the difference between connection-oriented services and connectionless services.
c) Explain Web documents with its types.

Q.5 Answer the following (Any Two). **12**

a) Explain Distance Vector routing with example.
b) Explain HDLC in detail.
c) Explain TCP in detail.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: October/November - 2025
Mobile Computing (2318208)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ). **08**

1) Which of the following offers packet mode data, transfer service over the cellular network?
   a) TCP b) GPRS
   c) GSM d) None of the above

2) WAP is ____ suite.
   a) Protocol b) Message
   c) Security d) None of the above

3) Which of the following are the components of WAP?
   a) Addressing model b) WML
   c) WML Script d) All the above

4) The term "HLR" stands for the _____.
   a) Home Location Register b) House Location Register
   c) Home Live Register d) None of the above

5) Which of the following WAP protocol stack is an adaption type of layer?
   a) WAE b) WSP
   c) WTP d) WDP

6) Bluetooth supports _____.
   a) Point-to-point connections
   b) Point-to-multipoint connection
   c) Both point-to-point connections and point-to-multipoint connection
   d) Multipoint to point connection

7) Which of the following is considered as the heart of the Global Systems for Mobiles (or GSM)?
   a) Networks Switching Sub System
   b) Operational Support Sub-system
   c) Base Station Subsystem
   d) None of the above

8) GEO stands for _____.
   a) Geostationary Earth Orbit
   b) Geographical Earth Orbit
   c) Geostructure Element Orbit
   d) Geostructure Earth Orbit

B) Fill in the blanks. **04**

1) The term "VLR" stands for the _____.
2) An interconnected collection of piconet is called _____.
3) _____ is the most popular standard for mobile phones in the world.
4) _____ card used in phones are smart processor cards.

Q.2 Answer the following (Any Six) **12**

a) Define Handoff.
b) What is WML?
c) What are the types of Wireless LAN?
d) Write any two advanced techniques in Mobile Computing.
e) Define Virtual Private Network.
f) What are the applications of Wireless LAN.
g) What is the use of HLR.
h) Write the applications of Global Mobile Satellite System.

Q.3 Answer the following (Any Three) **12**

a) Write a note on CDMA 2000
b) Write about the IMT 2000 (3G) Mobile Services.
c) Write a note on WAP.
d) Write about Mobile IP.

Q.4 Answer the following (Any Two). **12**

a) Explain GSM Call Termination Operation.
b) Write in detail about Network Signalling.
c) Write in details about the Bluetooth Technology.

Q.5 Answer the following (Any Two). **12**

a) Explain the architecture of Infrastructure based Wireless LAN IEEE standard 802.11
b) Draw and explain the GPRS architecture.
c) Explain the Case Study of the GLOBALSTAR.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Digital Image Processing (2318301)

Day & Date: Wednesday, 29-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed.

Q.1 A) Choose correct alternative from the following. **08**

1) An 8-bit RGB color image having size 16X64 needs _____ kbytes of storage.
   a) 3 b) 24
   c) 1024 d) 3072

2) The second order derivative of image sharpening called as _____.
   a) Gaussian b) Laplacian
   c) Canny d) Euclid

3) Fisher in 1936 proposed _____ problem.
   a) recognition b) identification
   c) classification d) description

4) A filter in which the filtering is applied separately for illumination and reflectance component is _____ filtering.
   a) Frequency domain b) Spatial domain
   c) Homomorphic d) Lowpass

5) In medical imaging ultrasound image is generated by the waves reflected from the boundary between _____.
   a) Fluid and soft tissue b) Soft tissue & bone
   c) Other side of boundary d) All the above

6) Gamma correction is mostly used in _____.
   a) CRT b) Audio
   c) Radio d) Music

7) DFT stands for _____.
   a) Digital Fourier Transform
   b) Discrete Fourier Table
   c) Discrete Fourier Transform
   d) Digital Fourier Table

8) An 8-bit grayscale image after normalization will have intensity values in the range of _____.
   a) [-1, 1] b) [0,1]
   c) [0,255] d) [1,256]

B) Fill in the blanks. **04**

1) The city block distance between (7, -4, 6) and (5, 2, 8) is _____.
2) Closing is the sequence of _____ followed by _____.
3) Image Segmentation: Dividing an image into regions based on _____ or _____.
4) A _____ filter is used to reduce noise in an image by averaging the pixel values of neighboring pixels.

Q.2 Answer the following. (Any Six) **12**

a) Define Digital Image Processing.
b) Define Ideal Band reject filter.
c) Write expression for reflection and translation.
d) Define pattern class.
e) List basic gray level transformations.
f) Compute value of following pixel when log transformations are applied: intensity = 200, *c* = 1.5 and *gamma* - 0.5.
g) Define Fourier spectrum.
h) What is sampling?

Q.3 Answer the following. (Any Three) **12**

a) Explain different distance measure between pixels.
b) Describe uniform noise model.
c) Explain pattern class and pattern recognition.
d) What is adaptive thresholding? When it is used?

Q.4 Answer the following. (Any Two) **12**

a) Explain different order statistic filter.
b) Describe hit or miss transform with example.
c) Explain contrast stretching technique.

Q.5 Answer the following. (Any Two) **12**

a) Explain Fundamental step of digital image processing.
b) Perform OR operation on following two images.

58	22	36
42	13	2
53	49	64

18	38	47
29	4	51
41	33	19

c) Find mean vector and covariance matrix for the following vectors:
$X1 = (0,1,1,1)\,T, X2 = (0,0,1,0)\,T, X3 = (1,1,1,0)\,T, X4 = (1,0,1,1)T$

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Data Warehousing and Data Mining (2318302)

Day & Date: Friday, 31-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) An _____ system is customer-oriented and is used for transaction and query processing.
   a) OLAP b) OLTP
   c) OLEP d) None of these

2) An _____ system manages large amounts of historic data.
   a) OLAP b) OLTP
   c) OLEP d) None of these

3) The _____ schema is a variant of the star schema model.
   a) Fact constellation schema
   b) Star schema
   c) Snowflake schema
   d) Hybrid schema

4) The Roll-up operation is also called _____.
   a) Drill-up b) Drill-down
   c) Drill-rotate d) Rule-up

5) 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

6) A _____ contains a subset of corporate-wide data that is of value to a specific group of users.
   a) Enterprise warehouse b) Data Mart
   c) Virtual warehouse d) Refresh

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

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

B) Write True or False. **04**

1) Roll-up operation is also called pivot operation.
2) An OLTP system focuses mainly on the current data within an enterprise or department.
3) Data mart contains a subset of corporate-wide data that is of value to a specific group of users.
4) The snowflake schema is a variant of the star schema model.

Q.2 Answer the following. (Any Six) **12**

a) What is virtual warehouse?
b) What is mean by backend tools utilities?
c) What is gain index?
d) What is Data Reduction?
e) What do you mean by meta data repository?
f) What is binning technique?
g) What do you mean by refresh the data?
h) Write an example of binary type of data in cluster analysis.

Q.3 Answer the following. (Any Three) **12**

a) What is Data Integration? Explain it.
b) Explain the use of Operation-derived hierarchies with suitable example.
c) Explain various issues regarding with clustering.
d) What is supervised learning? Explain with example.

Q.4 Answer the following. (Any Two) **12**

a) Explain how associations rules are constructed in multi-level hierarchy.
b) What is data cube? Explain different forms of multidimensional model.
c) Explain Agglomerative hierarchical method.

Q.5 Answer the following. (Any Two) **12**

a) Explain the back propagation method with example.
b) Explain three-tier data warehouse architecture with well labelled diagram.
c) Explain the applications of data mining.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Open Source Technologies (PHP, MySql) (2318306)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Which of the following is the Concatenation Operator in PHP?
   a) + (Plus) b) .(dot)
   c) & (Ampersand) d) %(percentage)

2) The _____ Function is used to read a single character from a file.
   a) fgetc() b) fgets()
   c) fget() d) fgetf()

3) Which of the following is the correct syntax to write a PHP code?
   a) < ?php > b) < php >
   c) < ? php ?> d) <? ?>

4) PHP Stands for _____.
   a) Php Hypertext Processor
   b) Php Hypertext Preprocessor
   c) Php Hypermarkup Preprocessor
   d) Php Hypermarkup Processor

5) What does isset() function do in PHP?
   a) There is no such function in PHP
   b) It checks whether variable is set or not
   c) It checks whether variable is free or not
   d) It checks whether variable is string

6) The _____ statement is used to display output in PHP.
   a) Write b) Echo
   c) Print d) Both b and c

7) The _____ function is used to adds a value at the end of array.
   a) into_array() b) inend_array()
   c) array_usshift() d) array_push()

8) Which one of the following methods is responsible for sending the query to the database?
   a) query() b) send_query()
   c) sendquery() d) mysqli_query()

B) Fill in the blanks. **04**

1) In mysql the database name is select using _____ method.
2) _____ keyword is used to implement raise the exception.
3) The ____ function is used to set cookie in the PHP.
4) The _____ function checks if the “end-of-file” (EOF) has been reached.

Q.2 Answer the following (Any Six) **12**

a) What is the use of $ REQUEST variable?
b) How will you include the content of a PHP file into another PHP file?
c) What is function? Give an example.
d) How will you start a session in PHP?
e) How will you access the size of the uploaded file in PHP?
f) What is the purpose of $GLOBALS variable in PHP?
g) How will you get the current date and time using PHP?
h) How will you connect a MySQL database using PHP?

Q.3 Answer the following (Any Three) **12**

a) Explain the syntax and usage of Multidimensional Arrays in PHP. Give example.
b) Discuss the get and post methods used in HTTP to handle form data.
c) What is Session? Explain session state management in detail.
d) Explain client side scripting and server side scripting with example.

Q.4 Answer the following (Any Two). **12**

a) Write the PHP code for fetching the data from a database to a webpage.
b) Write PHP script to sending and receiving email.
c) Write PHP script to check given number is Armstrong or not.

Q.5 Answer the following (Any Two). **12**

a) What is exception handing? Explain how to create user define exception with example.
b) What is validation? Create a registration form with validation.
c) What are different steps to create MySQL API Database applications?

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Artificial Intelligence (2318307)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ fuzzy input vectors to crisp outputs.
   a) Neuro-fuzzy b) Fuzzy – backpropagation
   c) Neuro-genetic d) Fuzzy –genetic

2) _____ represent objects that do not change values.
   a) Constants b) Variables
   c) Predicates d) Subject

3) A heuristic is a way of trying _____.
   a) To discover something or an idea embedded in a program
   b) To search and measure how far a node in a search tree seems to be from a goal
   c) To compare two nodes in a search tree to see if one is better than the other is
   d) All of the above

4) Ambiguity may be caused by _____.
   a) syntactic ambiguity b) multiple-word meanings
   c) unclear antecedents d) all of the above

5) DARPA, the agency that has funded a great deal of American Artificial Intelligence research, is part of the Department of _____.
   a) Defense b) Energy
   c) Education d) Justice

6) Graph used to represent semantic network is _____.
   a) Undirected graph
   b) Directed graph
   c) Directed Acyclic Graph (DAG)
   d) Directed complete graph

7) Machine learning is _____.
   a) The autonomous acquisition of knowledge through the use of computer programs
   b) The autonomous acquisition of knowledge through the use of manual programs
   c) The selective acquisition of knowledge through the use of computer programs
   d) The selective acquisition of knowledge through the use of manual programs

8) Neural Computing is _____.
   a) mimics the human brain
   b) information processing paradigm
   c) Both a and b
   d) none of the above

B) Fill in the blanks. **04**

1) _____ is the well-known Expert System for medical diagnosis systems.
2) The learning method does not present the target output to the network _____.
3) The reproduction operator is also known as _____.
4) The number of elements in a set is called its _____.

Q.2 Answer the following (Any Six) **12**

a) What are the types of agents?
b) What are the advantages of the AO* algorithm?
c) Define:
   a) Informationgain
   b) GiniIndex
d) Explain the steps in natural language processing.
e) List out the advantages of production systems.
f) What is the difference between local maxima and ridge?
g) What is matching?
h) Why is there a need for an inference rule?

Q.3 Answer the following (Any Three) **12**

a) Differentiate between supervised and unsupervised learning.
b) Discuss the breadth-first search technique with the help of an example.
c) Explain Dempster-Shafer's theory.
d) State and explain the water jug problem with a suitable example.

Q.4 Answer the following (Any Two). **12**

a) What are the different tasks of Artificial Intelligence? Explain in detail.
b) Explain the genetic algorithm in detail.
c) What is an expert system? Explain in detail.

Q.5 Answer the following (Any Two). **12**

a) Explain the constraint satisfaction problem in AI to solve SEND + MORE = MONEY.

b) Explain the alpha-beta pruning algorithm with an example.

c) Explain forward chaining and backward chaining with examples.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Cloud Computing (2318308)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Which of the following are the features of cloud computing?
   a) Security b) Large Network Access
   c) Availability d) All of the mentioned

2) Which of the following is the correct statement about cloud computing?
   a) Cloud computing abstracts systems by pooling and sharing resources
   b) Cloud computing is nothing more than the Internet
   c) The use of the word “cloud” makes reference to the two essential concepts
   d) All of the mentioned

3) Which of the following is the Cloud Platform provided by Amazon?
   a) AWS b) Cloudera
   c) Azure d) Google

4) _____ offering provides the tools and development environment to deploy applications on another vendor’s application.
   a) PaaS b) IaaS
   c) CaaS d) KaaS

5) _____ is a cloud computing service model in which hardware is virtualized in the cloud.
   a) IaaS b) CaaS
   c) PaaS d) None of the mentioned

6) Which of the following is the most complete cloud computing service model?
   a) PaaS b) IaaS
   c) CaaS d) SaaS

7) Which of the following component is called hypervisor?
   a) VGM b) VMc
   c) VMM d) All of the mentioned

8) _____ provides virtual machines, virtual storage, virtual infrastructure, and other hardware assets.
   a) IaaS
   b) SaaS
   c) PaaS
   d) All of the mentioned

B) Write True/False. **04**

1) Cloud computing presents new opportunities to users and developers.
2) Private cloud doesn't employ the same level of virtualization.
3) Virtualization assigns a logical name for a physical resource and then provides a pointer to that physical resource when a request is made.
4) Cloud computing relies on a set of protocols needed to manage inter-process communications.

Q.2 Answer the following (Any Six) **12**

a) What is Network?
b) Define Web Service?
c) What is EC2?
d) What do you mean by VM?
e) What is Web 2.0?
f) What is Data Security?
g) What is Server?
h) What is Internet?

Q.3 Answer the following (Any Three) **12**

a) What is distributed Storage systems?
b) What is Network Level Security?
c) What is Machine Image?
d) Define Cloud?

Q.4 Answer the following (Any Two). **12**

a) Explain in detail the concept of PaaS with suitable example?
b) Discuss in detail role of network and protocols used in Cloud Computing?
c) What is Iaas? Explain in detail Resource virtualization with suitable example?

Q.5 Answer the following (Any Two). **12**

a) Explain Cloud Platform and Management using Google App Engine service?
b) What is Cloud Computing? Discuss Cloud Deployment Model with example?
c) What is SaaS? State and explain various characteristics of SaaS with example?

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: October/November - 2025
Machine Learning (2318401)

Day & Date: Tuesday, 28-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) Machine Learning is programming _____ to optimize a performance criterion using example data or past experience.
   a) Humans b) Chipsets
   c) Computers d) Humanoids

2) In finding an association rule, that means learning a _____ probability.
   a) Unit b) Conditional
   c) Unconditional d) Derived

3) A rule that fits the past data, if the future is similar to the past, then researchers can make correct predictions for _____ instances.
   a) Unpredictable b) Un-useful
   c) Novel d) Worthy

4) A robot navigating in an environment in _____ of a goal location is another application area of reinforcement learning.
   a) Killing b) Dressing
   c) Shooting d) Search

5) Machine Learning application areas like vision, _____, and robotics are also tasks that are best learned from sample data.
   a) Sense b) Speech
   c) Common sense d) Verbal

6) _____ formalism allows us to define our prior information on the hidden factors and the model, as well as to infer the model parameters.
   a) Mitchell b) Bill Gates
   c) Bayesian d) Hinton

7) If there is noise, an over complex hypothesis may learn not only the underlying function but also the _____ in the data and may make a bad fit.
   a) Waste b) Command
   c) Noise d) Rule

8) Principal Component Analysis (PCA) is an _____ method in that component analysis does not use the output information; the criterion to be maximized is the variance.
   a) Unsupervised b) Semi-supervised
   c) Supervised d) Lost and Win

B) Write True/False. **04**

1) Learning cannot be viewed as the task of searching through a large space of hypotheses implicitly defined by the hypothesis representation.
2) Lasso regression is a linear regression technique that combines model building with feature selection by adding a penalty term to the cost function, which forces some coefficients to zero, effectively removing less important predictors from the model.
3) KNN is an Unsupervised learning algorithm primarily used for clustering.
4) Decision tree learning is a method for approximating continuous-valued target functions.

Q.2 Answer the following. (Any Six) **12**

a) What is Deep Learning?
b) Define Unsupervised Learning.
c) What do you mean by Association Rule?
d) Define Posterior Probability.
e) What is Conditional Dependence?
f) Define Reinforcement Learning.
g) What is a PCA?
h) What is Bias and Variance?

Q.3 Answer the following. (Any Three) **12**

a) Explain the concept of Decision Tree.
b) What do you mean by Supervised Learning?
c) Explain in brief Machine Learning versus Artificial Intelligence.
d) What do you mean by Regression?

Q.4 Answer the following. (Any Two) **12**

a) Explain Association rule of Market Basket Analysis using Apriori algorithm with suitable example.
b) Differentiate between Supervised and Unsupervised Learning with suitable example.
c) State and explain the working of K-Nearest Neighbor Algorithm with suitable examples.

Q.5 Answer the following. (Any Two) **12**

a) Explain various steps of K-Means Clustering for Given Points – M(2, 2), N(3, 2), P(1, 1), Q(3, 1), R(1.5, 0.5) and with initial cluster points (3,1) and (1,1).
b) Differentiate between Linear versus Logistic Regression with suitable example.
c) What is Machine Learning? Explain various applications of Machine Learning.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: October/November - 2025
Network Security (2318402)

Day & Date: Thursday, 30-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) _____ is the scrambled message produced as output.
   a) Continuous text b) Plaintext
   c) Ciphertext d) Random text

2) ESP stands for _____.
   a) Encryption Security Protocol
   b) Encipher Security Principle
   c) Encryption Sequence Protocol
   d) Encapsulated Security Payload

3) The art of breaking ciphers is known as _____.
   a) Cryptography b) Cryptanalysis
   c) Cryptology d) Crypting

4) Typically, PKI implementation make use of _____.
   a) Digital Signature b) Biometric
   c) X.509 certificates d) None of these

5) _____ an entity capable of accessing objects.
   a) Object b) Subject
   c) Access right d) None of these

6) _____ a monotonically increasing counter value; this provides an anti-replay function.
   a) Sequence Number b) Security parameters Index
   c) Payload Data (variable) d) None of these

7) _____ is an open-source freely available software package for e-mail security.
   a) TCP b) IBM
   c) Windows d) PGP

8) _____ indicates the number of pad bytes immediately preceding this field.
   a) Pad Length (8 bits)
   b) Next Header (8 bits)
   c) Authentication Data (variable)
   d) None of these

B) Write True or False. **04**

1) Security mechanism is a process that is designed to detect, prevent, or recover from a security attack.
2) Active attacks are in the nature of eavesdropping on, or monitoring of, transmissions.
3) A stream cipher processes the input elements continuously, producing output one element at a time as it goes along.
4) Plaintext is the scrambled message produced as output.

Q.2 Answer the following. (Any Six) **12**

a) Explain Release of message content.
b) What is mean by access control mechanism?
c) What is mean by cryptology?
d) Explain the applications of IPSec.
e) What is Encryption algorithm?
f) What are the benefits of Digital Signature?
g) What is smart card? Explain advantages of smart card.
h) What is firewall?

Q.3 Answer the following. (Any Three) **12**

a) What is biometric? Explain the applications of biometrics in different fields.
b) Explain the importance Digital signature with example.
c) Explain Model for Network security with well labelled diagram.
d) Explain Bell-LaPadula model with example.

Q.4 Answer the following. (Any Two) **12**

a) What is Attack? Explain different types of Active attacks.
b) How stream cipher works? Explain with example.
c) Explain the benefits of IPSec.

Q.5 Answer the following. (Any Two) **12**

a) What is Pretty Good Privacy (PGP)? Explain various features of PGP.
b) Explain IDEA algorithm with suitable example.
c) What is intruder? Explain Audit record as an intrusion detection tool.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: October/November - 2025
Net Technology (2318405)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) What does the CLR in *C#* do?
   a) Manages the execution of Webpages programs
   b) Manages the execution of .NET programs
   c) Manages the parsing of the various types
   d) All of these

2) C# programming language is used to develop _____.
   a) Web apps b) Desktop apps
   c) Mobiles apps d) All of these

3) What is the extension of the ASP.NET page?
   a) .asp b) .aspx
   c) .asx d) .apx

4) HTML controls are?
   a) Server-side controls b) Client-side controls
   c) Both d) None

5) Which is the first event triggered when a user requests an ASP.NET page?
   a) Load b) Init
   c) Prelnit d) PreLoad

6) In ASP.NET application DLL files are stored in which folder?
   a) Bin b) App_Data
   c) App_Code d) App_LocalResources

7) Which validation control in ASP.NET can be used to determine if the data is entered into a Text Box control is of type Currency?
   a) Compare Validator b) Validation Summary
   c) Required Field Validator d) None of the above

8) Which programming model should you implement if you want to separate your server-side code from your client-side layout code in a Web page?
   a) Single-file model
   b) Client-server model
   c) Inline model
   d) Code-behind model

B) Fill in the blanks. **04**

1) CLR stands for _____.
2) Every C# statement is terminated by _____.
3) _____ is used to validate complex string patterns like an e-mail address.
4) The first event triggers in an aspx page is _____.

Q.2 Answer the following (Any Six) **12**

a) What is the role of the .NET framework?
b) What is JIT compiler?
c) What is CLR?
d) What is a Data Adapter?
e) What are application folders in ASP.NET?
f) List any four ASP.NET server controls.
g) What is the use of Hidden Field in ASP.NET.
h) Mention any two math functions available in C#.

Q.3 Answer the following (Any Three) **12**

a) What are the types of data types used in C#? List all types and their subtypes.
b) Explain #define and #under with example.
c) What is validation? Explain Range Validator Control with example
d) Explain global. asax file in detail.

Q.4 Answer the following (Any Two). **12**

a) What is master page? Explain steps to create master page.-
b) Write difference between ASP & ASP.Net.
c) Explain Regular Expression Validation control and Custom Validation control with example.

Q.5 Answer the following (Any Two). **12**

a) Explain the architecture of ASP.NET.
b) What is the use of Session State in ASP.NET? Explain with example?
c) What is use of \App_GlobalResource and \App_LocalResource folder? Explain with example.

Seat No.		Set	P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: October/November - 2025
Block Chain Technology (2318406)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) When a record is on a blockchain, who can access it?
   a) One person at a time
   b) Multiple people simultaneously
   c) Only the people involved in the transaction
   d) None of these

2) Which is a part of asymmetric encryption?
   a) Mining b) Public key
   c) Both of these d) None of these

3) When did bitcoin's creator publish a whitepaper introducing the digital currency?
   a) 2007 b) 2008
   c) 2009 d) None of these

4) Who is introduced the digital online cryptocurrency known as Bitcoin?
   a) Satoshi Nakamoto b) Nick Szabo
   c) Wei Dai d) Hal Finney

5) What is the genesis block?
   a) Any block created by the founder
   b) The last block created in the Blockchain
   c) The first block of a Blockchain
   d) Decentralized application

6) P2P Stand for _____.
   a) Password to Protect b) Protection to product
   c) Peer to peer d) Private key to public key

7) Who created Ethereum?
   a) Vitalik buterin b) Satoshi Nakamoto
   c) John Mcafee d) None of these

8) EVM stands for _____.
   a) Ethereum Virtual Machine
   b) Electronic Virtual Machine
   c) E Voting Machine
   d) None of these

B) Write true or false. **04**

1) It is possible to modify the data once it is written in a block?
   a) True b) False
2) Bitcoin is a crypto currency, which is an application of Block chain.
   a) True b) False
3) A Node is computer on block chain.
   a) True b) False
4) Cryptographic Hash function transforms arbitrary length string that act more or less as a fingerprint of the document.
   a) True b) False

Q.2 Answer the following (Any Six) **12**

a) NONCE.
b) Technologies invented Block chain 3.
c) EVM.
d) Trilemma of blockchain.
e) State different features of sharding?
f) What are different applications of blockchain.
g) Proof of Stake?
h) Private Blockchain.

Q.3 Answer the following (Any Three) **12**

a) What is Byzantine Generals Problem?
b) Explain Proof of work
c) What is smart contract and how it similar to real contract?
d) What is difference between Blockchain 1.0 and Blockchain 2.0?

Q.4 Answer the following (Any Two). **12**

a) What is Byzantine Fault Tolerance? Explain in detail
b) Explain Bitcoin scripting vs. Ethereum Smart Contracts
c) What is Hyperledger fabric? Explain benefits of Hyperledger fabric?

Q.5 Answer the following (Any Two). **12**

a) What is Verifiable Random Functions (VRF)? Explain in detail.
b) State difference between Bitcoin and Etherneum?
c) What is Permissioned Blockchain? How access control is implemented in Permissioned Blockchain?

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: October/November - 2025
Soft Computing (2318407)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Fill in the blanks by choosing correct alternatives given below. 08

1) Which of the following represents the values of set membership?
   a) Degree of truth b) Probabilities
   c) Discrete set d) Both a & b

2) Which of the following condition can directly influence a variable by all the others?
   a) Fully connected b) Local connected
   c) Partially connected d) None of the above

3) Name the input function received by neurons, which is also known as the neuron's internal state.
   a) Weight
   b) Bias
   c) Activation or neuron's activity level
   d) None of the above

4) Which of the following exhibits non-linear functions to any desired degree of accuracy?
   a) Neuro-fuzzy b) Neuro-genetic
   c) Fuzzy-genetic d) None of the above

5) Who initiated idea of Soft Computing _____.
   a) Charles Darwin b) Lofzi A Zadeh
   c) Rechenberg d) Mc_Culloh

6) Genetic Algorithms are part of _____.
   a) Evolutionary Computing
   b) Inspired by Darwin's Theory about evolution
   c) Are adaptive heuristic search
   d) All of these

7) What is the purpose of fuzzy relations in fuzzy logic?
   a) To define crisp relationships between elements
   b) To model uncertain or vague relationships between elements

c) To eliminate ambiguity in relationships
d) To establish precise connections between elements

8) What is the first step in fuzzyfication process in fuzzy control?
a) Defuzzification
b) Membership function application
c) Rule evaluation
d) Data collection

B) Write True/False **04**

1) Composition operation is used to combine fuzzy relations in fuzzy systems.
2) Function of the centroid method in defuzzification is to determine the center of gravity of the fuzzy output.
3) The fitness function determines the performance or suitability of individuals within a population based on the problem domain.
4) The Mutation function determines which individuals will contribute to the next generation based on their fitness scores.

Q.2 Answer the following (Any Six) **12**

a) What is output Layer?
b) What do you mean by Cartesian Product?
c) What is Artificial Neuron Network?
d) Define Crisp Set.
e) What is Rank Selection?
f) What is Alpha cut?
g) Define Hard Computing.
h) What is Genetic Encoding?

Q.3 Answer the following (Any Three) **12**

a) What is the Crisp and Fuzzy Relations?
b) What do you mean training of Neural Networks?
c) What is Fuzzy Complements?
d) What do you mean by Genetic Algorithm?

Q.4 Answer the following (Any Two). **12**

a) Define Soft Computing? Explain in detail back propagation learning for neural networks computing?
b) Define Reproduction? State various types of Selection methods with suitable example?
c) Explain in detail Binary Relations on single set with suitable example?

Q.5 Answer the following (Any Two). **12**

a) State and differentiate between Fuzzy Set versus Crisp Set?
b) Explain in detail various Learning methods for Artificial Neural Computing?
c) State and explain various types of Fuzzy Set Operations with suitable example?

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New/Old) (CBCS) Examination: October/November - 2025
.Net Technology (MSC18401)

Day & Date: Tuesday, 28-10-2025 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. (MCQ) **10**

1) In C#, Console is _____.
   a) Structure b) Method
   c) Class d) Enumeration

2) Which of the following is the application of delegate?
   a) Event handling b) Callback methods
   c) Multithreading d) All of these

3) IL in .Net stands for _____.
   a) International Language b) Interoperate Language
   c) Intermediate Language d) Intermediate Local

4) What is the return type of IsPostBack property?
   a) Integer b) Boolean
   c) Float d) String

5) Which file contains the Application_Start event?
   a) Global.asax b) Web.config
   c) Local.asax d) System.Web

6) Which of the following statement is correct about datatype?
   a) Every datatype is either value type or reference type
   b) Value types are always created on the heap
   c) Reference types are always created on the stack
   d) All of these

7) Which of the following statement is correct about master page?
   a) You can add more than one master page in a website.
   b) Master page can be nested
   c) Both a and b
   d) None of these

8) _____ property sets URL of the page that is requested when the user clicks the button.
   a) PostBackLink b) PostBackUrl
   c) UrlLink d) Link

9) ____ is not validation control defined in ASP.Net.
   a) RequiredFieldValidator
   b) TextValidator
   c) RegularExpressionValidator
   d) CustomValidator

10) In ASP .net Server side Controls are useless without _____ property.
   a) Name b) Text
   c) Visible d) Runat

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

1) The syntax to create a RadioButton control is _____.
2) _____ event is used to trigger on selection change for ASP.NET CheckBox control.
3) Master Page will use _____ directive on the top of a page.
4) The role of the Global.asax file is _____.
5) ADO.Net is used for _____.
6) Boxing means conversion of _____.

Q.2 Write short note on the following. **16**

a) COM and COM+
b) Reflection
c) Namespaces and its advantages
d) CTS

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

a) Design a web page that displays five advertisements using AdRotator control.
b) What is the ASP.Net directive? Explain different directives used in ASP.Net.

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

a) What is validation? Explain custom validation with example.
b) What is event? Explain with example.

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

a) What is a master pages in ASP.Net? Explain with example.
b) What is multicast delegate? Explain with suitable example.

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

a) Explain different ASP.Net page events.
b) Explain detail description on Microsoft .NET framework.

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

a) Explain in detail client side and server side validation with its advantages.

b) Create a web application to search a particular record from the employee table.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - IV) (New/Old) (CBCS)
Examination: October/November – 2025
Machine Learning (MSC18402)

Day & Date: Thursday, 30-10-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.No.1 and 2 are compulsory.
2) Attempt any three 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 _____ algorithm is NOT considered as common machine learning algorithm.
   a) Decision Trees b) Neural Networks
   c) QuickSort d) Random Fores

2) The first step in any ML project is _____.
   a) Model training b) Model testing
   c) Dimensionality reduction d) Data Summarization

3) The _____ method uses feedback to determine the next action in Reinforcement Learning.
   a) Policy Gradient b) Random sampling
   c) Q-learning d) K-Means clustering

4) The _____ algorithm is considered as unsupervised learning algorithm.
   a) Decision Tree b) K-Means Clustering
   c) Logistic Regression d) Linear Regression

5) The _____ statement differentiates Al from Machine Learning.
   a) Al uses neural networks, while ML doesn't
   b) Machine Learning requires data input; Al does not
   c) Al includes reasoning and decision-making; ML focuses on data patterns
   d) ML doesn't use supervised learning

6) In KNN, 'K' represents the number of _____.
   a) features in the data
   b) nearest neighbors to consider
   c) iterations
   d) clusters

7) The main purpose of LASSO (Least Absolute Shrinkage and Selection Operator) technique is to _____.
   a) Minimize model bias
   b) Select important features by setting their weights to zero
   c) Ensure faster convergence
   d) Reduce noise in data

8) ARIMA is a mainly used for _____.
   a) Time series forecasting b) Dimensionality reduction
   c) Clustering data points d) Predictive modeling using

9) Scikit-learn package is primarily used for _____
   a) Visualization tasks
   b) Data manipulation
   c) Implementing ML algorithms
   d) Dimensionality reduction

10) The main goal of data cleaning in the ML pipeline is _____.
   a) Transform data into a readable format
   b) Eliminate redundant and missing data
   c) Train models faster
   d) Test models with noisy data

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

1) In _____ machine learning technique involves labeled data.
2) The model performs well on the training data but poorly on test data is known as _____.
3) The _____ package is used to perform matrix computations in Python.
4) PCA stands for _____.
5) Logistic Regression computes probabilities using the ____ function.
6) To creates a NumPy array of all zeros with shape (3, 3), _____ command is used.

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

a) What is Deep Learning? Explain in detail.
b) Explain types of Machine Learning in detail.
c) Explain Ensemble techniques with example.
d) What is Bias and Variance? Explain in detail

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

a) How do you create a Pandas Series and DataFrame from various data sources like lists, dictionaries and arrays? Explain how do you merge, join, and concatenate DataFrames in Pandas? Give example.
b) What is Time series analysis? Explain ARIMA in detail.

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

a) Explain decision tree regressor with example.
b) How can you create basic visualizations directly from Pandas using the plot() method? Give example of any 4 plots.

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

a) What is Natural Language Processing? Explain in detail with uses.

b) What is Support Vector Machine? Explain in detail.

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

a) From following dataset find value of Y for give value of X.

X	Y
43	99
21	65
25	79
42	75
57	87
59	81
55	?

b) What is Anomaly detection? Explain Anomaly detection techniques in detail.

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

a) Consider following data points divide into 2 cluster using Manhattan distance Data points are p1(1,2,3), p2(0,1,2), p3(3,0,5), p4(4,1,3) and p5(5,0,1)

b) What is use of SVD algorithm? Explain in detail.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - IV) (New/Old) (CBCS) Examination: October/November – 2025
Data Warehouse and Mining (MSC18403)

Day & Date: Saturday, 01-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.No.1 and 2 are compulsory.
2) Attempt any three 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 _____ Data Warehouse component is used for creating summaries or reports.
   a) OLAP tools b) Data Marts
   c) ETL tools d) Data Sources

2) The _____ terms best describes the process of aggregating data to higher levels.
   a) Drill Down b) OLTP
   c) Data Mart d) Roll-up

3) The _____ technique describe the process of assigning, data into predefined categories.
   a) Clustering b) Classification
   c) Regression d) Association.

4) The _____ algorithm is primarily associated with decision tree-based classification.
   a) K-Means b) Naive Bayes
   c) ID3 d) Backpropagation

5) The role of backpropagation in training neural networks is to _____.
   a) Visualize feature sets
   b) Update weights based on the error rate
   c) Select features for classification
   d) Eliminate redundant variables automatically

6) The _____ schema is commonly implemented to ensure efficient querying in OLAP.
   a) Fact Schema b) Star Schema
   c) Relational Schema d) Logical Schema

7) The _____ technique is NOT part of classification or prediction.
   a) Backpropagation b) Decision Tree Pruning
   c) Neural Networks d) Association Rule Mining

8) The _____ clustering method uses statistical models to classify data into clusters.
   a) Partitioning
   b) Model-based
   c) Neural Networks
   d) Outlier analysis

9) The _____ allows Association Rules to find patterns in data with varying levels of granularity.
   a) Multilevel association rule mining
   b) Confidence analysis
   c) Simple clustering models
   d) Multidimensional association rule mining

10) The main idea of Bayesian classification is to _____.
   a) Use probability to predict outcomes based on prior knowledge
   b) Use clustering techniques to assign groups
   c) Ignore prior distributions in prediction
   d) Train only on a subset of features

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

1) The _____ splitting criterion is commonly used in decision tree classification.
2) Normalizing and converting data to suitable formats is known as _____.
3) The _____ clustering method focuses on grouping points in based on density.
4) The _____ algorithm is commonly used to find association rules.
5) To removes inconsistencies and errors from the data is known as _____.
6) Data about data is called as _____.

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

a) Explain applications of Classification and Clustering technique.
b) What are issues related to data mining? Explain in detail.
c) What is schemas? Explain different types of schemas used in data warehousing.
d) Explain Outlier Analysis in detail.

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

a) Explain when to use Regression techniques? Explain different types of regression with example.
b) What is classification? Explain rule base algorithm in detail.

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

a) What is clustering? Explain Hierarchical clustering Methods in detail.
b) What is multidimensional association? Explain with example.

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

a) What is Normalization and Standardization? Explain with example.
b) What is Data Integration? Explain different techniques with example.

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

a) By using following dataset identify the species of an entity with the following attributes using a naive Bayes classification.

Sl.No.	Color	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

b) Explain application of data mining in web log analysis.

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

a) Find frequent set of following dataset using min_supp=2.

Transaction ID	Items
T1	Hot Dog, Buns, Ketchup
T2	Hot Dogs, Buns
T3	Hot Dogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	Hot Dogs, Coke, Chips

b) Explain data mining functionality in detail.

Seat No.		Set	P

M.Sc. (Computer Science) (Semester - IV) (New/Old) (CBCS)
Examination: October/November - 2025
Soft Computing (MSC18409)

Day & Date: Tuesday, 04-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 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) In computing the output is called as _____.
   a) Consequent b) out feed
   c) antecedents d) premise

2) Soft computing is based on _____.
   a) fuzzy logic b) neural science
   c) crisp software d) binary logic

3) Hard computing is also called as _____.
   a) evolutionary computing
   b) conventional computing
   c) non-conventional computing
   d) probabilistic computing

4) Artificial neural network is used for _____.
   a) pattern recognition b) classification
   c) Clustering d) all of the above

5) What does the 0 membership value means in the set _____.
   a) the object is fully inside the set
   b) the object is not in the set
   c) the object is partially present in the set
   d) none of the above

6) Fuzzy logic deals with which of the following _____.
   a) fuzzy set b) fuzzy algebra
   c) both a and b d) none of the above

7) Mutation is applied on ____ candidates.
   a) one b) two
   c) more than two d) none of these

8) What are the parameters that affect GA are/is _____.
   a) selection process b) initial population
   c) both a and b d) none of these

9) Internal state of neuron is called _____, is the function of the inputs the neurons receives.
   a) Weight
   b) activation or activity level of neuron
   c) Bias
   d) none of these

10) _____ is/are the way/s to represent uncertainty.
   a) fuzzy logic b) Probability
   c) Entropy d) all of the mentioned

B) State True False. **06**

1) A Fuzzy logic is an extension to the Crisp set, which handles the Partial Truth.
2) Ability to learn how to do task based on the data is done by self organization.
3) Hard computing is tolerant of imprecision, uncertainty, partial truth, and approximation.
4) Crisp set theory is not capable of representing descriptions and classifications in many cases.
5) ART stands for "Adaptive Resonance Theory".
6) Fuzzy relations combining two fuzzy sets by connective "min operation" is an operation by Cartesian product.

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

a) What do you mean Neural Network?
b) What is Fitness Function?
c) Explain in brief alpha cut?
d) Define Fuzzy Set?

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

a) State and explain Fuzzy Intersection, Union and Complements with suitable example?
b) Explain Binary, Octal and Hexa-decimal encoding with suitable example?

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

a) Discuss in detail Back-propagation learning network?
b) State and differentiate between Fuzzy and Crisp set with example?

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

a) Explain in detail Roulette Wheel Selection method?
b) State and explain in detail various models of Artificial Neural Network?

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

a) State and explain in detail various operations of Fuzzy Relations?
b) What are the different characteristics of Artificial Neural Network?

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

a) State and explain Genetic Algorithm with Mutation Operator with example?

b) Explain in detail the concept of Soft, Hard and Hybrid Computing with suitable example?

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - IV) (New/Old) (CBCS)
Examination: October/November – 2025
Block chain Technology (MSC18410)

Day & Date: Tuesday, 04-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 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. (MCQ) **10**

1) Blockchain is a peer-to-peer _____ distributed ledger technology that makes the records of any digital asset transparent and unchangeable.
   a) Decentralized b) Demanding
   c) Popular d) None of these

2) Cryptography keys consist _____.
   a) Private Key b) Public Key
   c) Both of these d) None of these

3) Smart Contract characteristics do not include:_____.
   a) Fast and cost-effective b) high degree of accuracy
   c) Transparency d) Alterable

4) What is a DApp?
   a) Condiment
   b) type of cryptocurrency
   c) type of blockchain
   d) Takes an input of any length and returns a fixed-length

5) What is the genesis block?
   a) Any block created by the founder
   b) The last block created in the Blockchain
   c) The first block of a Blockchain
   d) decentralized application

6) P2P Stand for _____.
   a) Password to Protect b) Protection to Product
   c) Peer to Peer d) Private Key to Public Key

7) Who created Ethereum?
   a) vitalik buterin b) Satoshi Nakamoto
   c) John Mcafee d) None of these

8) EVM stands for _____.
   a) Ethereum Virtual Machine b) Electronic Virtual machine
   c) E Voting Machine d) None of these

9) Where do you store your cryptocurrency?
   a) Wallet b) Floppy Disk
   c) Bank account d) None of these

10) In _____ hackers generate numerous fake network nodes
   a) Sybil attack b) Phishing attack
   c) Both of these d) None of these

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

1) It is possible to modify the data once it is written in a block?
   a) True b) False
2) Bitcoin is a cryptocurrency, which is an application of Blockchain.
   a) True b) False
3) Decentralized blockchains are immutable?
   a) True b) False
4) A node is computer on blockchain network.
   a) True b) False
5) In Bitcoin in order to communicate, the opcodes (OP CODES) not used.
   a) True b) False
6) Hyperledger Fabric is not an open source framework.
   a) True b) False

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

a) Consensus algorithm methods.
b) Distributed Ledger.
c) Bitcoin.
d) Sharding.

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

a) What is Blockchain Technology? Explain features of blockchain technology.
b) Explain Cryptography keys in detail?

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

a) State difference between Proof of Work (PoW) and Proof of Stake (PoS)
b) What are Security issues in Blockchain? Explain in detail?

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

a) What is Verifiable Random Functions (VRF)? Explain in detail.
b) State difference between Bitcoin and Ethereum?

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

a) Explain blockchain 3.0 with Hyperledger fabric?

b) What is Permissioned Blockchain? Flow access control is implemented in Permissioned Blockchain?

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

a) What is Zero-Knowledge Systems (ZKS)? Explain in detail?

b) What is difference between Blockchain 1.0 and Blockchain 2.0?

Seat No.	

Set **P**

M.Sc. (Computer Science) (Sem - II) (New) (CBCS) Examination: October/November - 2025
Statistical Methods (MSC16208)

Day & Date: Monday, 24-11-2025 Max. Marks: 80
Time: 03:00 PM To 06:00 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. (MCQ) **10**

1) For a dataset, the arithmetic mean is 21. If all the values in the data are doubled, then what will be the arithmetic mean of new data?
   a) 21 b) 10.5
   c) 42 d) 11

2) Which of the following measure is always non-negative for any data?
   a) Mode b) Median
   c) Mean d) Range

3) The measure which is not affected by extreme observations is ____.
   a) Harmonic mean b) Geometric Mean
   c) Median d) Mean

4) Which of the following is a graphical tool to identify relationship between two variables?
   a) Correlation coefficient
   b) Spearman's rank correlation coefficient
   c) Scatter diagram
   d) None of these

5) The largest observation minus the smallest observation is called as ____.
   a) Mean deviation b) Standard deviation
   c) Range d) None of these

6) The hypothesis that completely specifies the population is called as _____.
   a) Simple hypothesis b) Composite hypothesis
   c) Complete hypothesis d) All of these

7) If X is following Poisson distribution, then it must be ____.
   a) A continuous variable
   b) A mixture of discrete and continuous variable
   c) A discrete variable
   d) None of these

8) Which of the following test is used for testing independence of attributes?
   a) Run test b) Sign test
   c) Signed rank test d) Chi-square test

9) If event A has 5 elements in it and the sample space contains 15 elements, then P(A) is ____.
   a) 0.3334 b) 0.5
   c) 0.45 d) 1.5

10) Which of the following is a continuous distribution?
   a) Poisson b) Uniform
   c) Binomial d) Bernoulli

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

1) If A is empty set, then its probability is ____.
2) Type-I error is rejecting _____, when it is true.
3) Geometric mean is the n^{th} root of ____ of all the data values, where n is the data size.
4) The probability of sample space is always ____.
5) If data is measured in meters, its standard deviation is measured in ____.
6) Standard deviation is the square root of ____.

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

a) Define arithmetic mean and geometric mean.
b) Define and explain correlation between two variables.
c) Define probability mass function and probability density function.
d) Define and explain critical region.

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

a) Explain Bernoulli and binomial distribution. Also state their means and variances.
b) Describe the test for equality of two means.

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

a) Discuss skewness and kurtosis.
b) Define arithmetic mean for a grouped data. Also determine the same for below data.

Classes	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	8	13	14	11	9

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

a) Discuss in detail run test and sign test.

b) Discuss in detail, ungrouped and grouped frequency distribution.

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

a) Discuss scatter diagram in detail. Illustrate with the help of example.

b) Describe exponential and normal distribution. Also state their means and variances.

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

a) Discuss the following measures of dispersion:

i) Range

ii) Standard Deviation

b) What is meant by rank correlation? Explain in details.