Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: March/April - 2026
Objects Oriented Programming using C++ (2318101)

Day & Date: Friday, 17-04-2026 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 determining 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.
c) Define Polymorphism and encapsulation.
d) Differentiate between keyword and identifier.
e) What do you mean by a token?
f) What are the different features of C++?
g) Differentiate between structure and union.
h) What is a template in C++?

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

a) Define pure virtual function and abstract class. How are they useful in C++?
b) What are command line arguments? Give example of the same.
c) State any four points of differentiation between compile time polymorphism and run time polymorphism.
d) Explain how friend functions are used in operator overloading with examples.

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

a) Explain explicit specialization of templates with an example.
b) Write a program to demonstrate multiple catch blocks and a catch-all handler in C++.
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) What are the advantages of using templates? Discuss compactness and flexibility.
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: March/April - 2026
Advanced DBMS (2318102)

Day & Date: Monday, 20-04-2026 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) Specialization is a _____ approach.
   a) Top-Bottom b) Top-Up
   c) Top-Down d) Bottom-Up

2) In which of the following formats data is stored in the Database Management System?
   a) Table b) Text
   c) Graph d) Image

3) _____ is the SQL command that is used for reverting changes performed by a transaction.
   a) Redo b) Rollback
   c) Commit d) View

4) Which normal form deals with multivalued dependency?
   a) 1NF b) 2NF
   c) 3NF d) 4NF

5) Modifications to the database occur while a transaction is still active, using the _____ modification technique.
   a) differed b) immediate
   c) shadowing d) None of These

6) 3-tier architecture is used in ____.
   a) Large Web Application b) Small Web Application
   c) Both a and b d) None of These

7) A _____ returns the Cartesian product of two tables, where each row from the first table is combined with every row from the second table.
   a) inner join b) outer join
   c) cross join d) All of These

8) Full form of DML is _____.
   a) Data Main Language b) Data Manipulation Language
   c) Data Manifest Language d) Delta Manipulation Language

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

1) Internal Schema is also known as Physical Schema.
2) Directory refers to the Data About Data.
3) Two transaction cannot have conflicting locks.
4) Hardware is not a component of DBMS.

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

a) List any two advantages of database systems.
b) Define data abstraction.
c) What are different types of data models?
d) Name the categories of SQL commands.
e) What is meant by instance and Schema of the database?
f) Write syntax of Update command.
g) List database users.
h) What is shadow paging?

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

a) What are the limitations of traditional file system?
b) What is view? Explain with example.
c) Write a note on in operator.
d) What is transaction? Explain states of transaction.

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

a) Explain aggregate functions with example.
b) What is distributed database? Explain the types of distributed database.
c) What is relational algebra? Explain select and union operation with example.

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

a) Explain cursor with example.
b) Briefly discuss about various lock based mechanisms used in concurrency control.
c) What is database recovery? Explain different recovery techniques.

SLR-PG-3

Seat No.	

Set P

M.Sc. (Computer Science) (Sem - I) (New) (NEP CBCS) Examination: March/April – 2026
Data Structures and Algorithms (2318107)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 3:00 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) Each node that makes up a _____ linked list consists of a value, and a reference to the next node in the list.
   a) Doubly b) Singly
   c) Priority d) Double Ended

2) A _____ is a term which refers to the kinds of data that variables may hold in a programming language.
   a) Variable b) Statements
   c) Library d) Data type

3) A matrix has many zero entries then such a matrix is called _____.
   a) Dense b) NULL
   c) Empty d) Sparse

4) A _____ is an ordered list in which all insertions and deletions are made at one end.
   a) Queue b) Linked List
   c) Array d) Stack

5) A Queue is an _____ list in which all insertions take place at one end called rear.
   a) Ordered b) Random
   c) Unordered d) Linked

6) Children of the same parent are called _____.
   a) Root b) Leaf
   c) Sibling d) Terminal

7) In Binary tree, any node can have at most _____ branches.
   a) Three b) Four
   c) Two d) One

8) _____ Algorithm is used to rearrange a given array or list of elements in an order.
   a) Sorting b) Searching
   c) String d) Array

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

1) Stack in linear data structure.
2) The one of the type of Queue is Single ended queue.
3) Stack data structure required for Breadth First Tree Traversal.
4) Tree data structure uses non recursive implementation of a recursive algorithm.

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

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

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

a) State and explain in brief Top of Stack with related operation status?
b) What is mean by Double Ended Queue?
c) Explain in brief Circular Linked List with example?
d) What do you mean by Breadth First Search?

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

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

4	**8**	**5**	**-**	**+**	**3**	*****	**9**	**+**

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

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

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

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS)
Examination: March/April - 2026
Operating System (2318108)

Day & Date: Wednesday, 22-04-2026 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) Binary semaphore is also called _____.
   a) Mutex b) Queue
   c) Stack d) Pipe

2) Race condition occurs when _____.
   a) One process runs
   b) Multiple processes access shared data
   c) CPU idle
   d) Memory full

3) Which of the following is used for inter-process communication?
   a) Pipes b) Registers
   c) Cache d) Compiler

4) A deadlock occurs when _____.
   a) Processes run independently
   b) Resources are unlimited
   c) Processes wait indefinitely
   d) CPU is idle

5) Which memory allocation method avoids external fragmentation?
   a) Contiguous allocation b) Paging
   c) Swapping d) Partitioning

6) Which of the following is not a page replacement algorithm?
   a) FIFO b) LRU
   c) Optimal d) FCFS

7) Which of the following is a Linux text editor?
   a) Notepad b) Word
   c) vi d) Excel

8) Disk scheduling algorithm that gives minimum seek time is _____.
   a) FCFS b) SSTF
   c) SCAN d) C-SCAN

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

1) A process is a program in execution.
2) Multilevel feedback queue can adjust process priority dynamically.
3) In Linux, the shell directly communicates with hardware.
4) The Banker's algorithm is used to prevent deadlock in operating systems.

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

a) List any four operating system services.
b) What is time-sharing system?
c) Define process scheduling.
d) What is inter-process communication?
e) Define critical section problem.
f) What is thrashing?
g) List the main features of Linux operating system.
h) What is Linux shell?

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

a) Explain any two types of operating system.
b) Describe FCFS and Round Robin scheduling.
c) Explain threads and their advantages.
d) Explain segmentation in memory management.

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

a) Explain deadlock detection and recovery.
b) Describe demand paging and its performance.
c) Explain directory structure and implementation.

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

a) Explain the role of monitors in process synchronization. How are they different from semaphores?
b) Describe disk scheduling algorithms: SCAN and C-SCAN.
c) Explain Linux file permissions. How can they be changed using the chmod, chown, and chgrp commands.

SLR-PG-5

Seat No.	

Set P

M.Sc. (Computer Science) (Semester - I) (New) (NEP CBCS) Examination: March/April - 2026
Research Methodology in Computer Science (2318103)

Day & Date: Friday, 24-04-2026 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) Research is related with _____.
   a) Discovery of new idea
   b) Solution of a problem
   c) Investigation of a problem
   d) All of the above

2) The major purpose of _____ research is description of the state of affairs as it exists at present.
   a) Applied b) descriptive
   c) analytical d) fundamental

3) The search for knowledge through objective and systematic method of finding solution to a problem is _____.
   a) Research b) search
   c) knowledge d) None of these

4) _____ research, the researcher has to use facts or information already available and analyse these to make a critical evaluation of the material.
   a) Quantitative b) descriptive
   c) Analytical d) Qualitative

5) A _____ is defined as a publication issued in successive part, usually at regular intervals, and as a rule, intended to be continued indefinitely.
   a) Conference b) periodical
   c) Research Paper d) Book

6) Final stage in the Research Process is _____.
   a) Problem formulation b) Data collection
   c) Data Analysis d) Report Writing

7) A _____, in general, refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation and want to obtain a solution for same.
   a) synopsis b) literature review
   c) Research Problem d) Abstract

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

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

1) The Design which gives the smallest experimental error is supposed to be the best design in many investigations.
2) Formulation of the Research Problem does not require primary data collection.
3) The method of collecting data by mailing the questionnaires to respondents is most extensively employed in various economic and business surveys.
4) The best way of understanding the problem is to discuss it with one's colleagues or with those having some expertise in the matter.

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

a) What is Hypothesis?
b) Give the example of diagnostic research.
c) What do you mean by International Journal.
d) Explain in short, the use of search engines.
e) What is Research Ethics?
f) Explain in short, the example of Quantitative research.
g) What is the need of sections/subsections in report?
h) Write a short note on empirical research.

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

a) Explain different steps involved in Research Process.
b) Explain Ethical issues in Research.
c) Write a short note on Virtual Lab.
d) Explain the different types of charts used in Research report.

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

a) What is literature review? Explain various sources of Literature review.
b) Explain the difference between Applied vs. Fundamental research with example.
c) What is research design? Explain the features of good research design.

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

a) What is Abstract? Explain the purpose of abstract in research report.
b) What is Research? Explain motivations in Research.
c) Explain the steps in Research writing.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - I) (CBCS) Examination: March/April – 2026
UML (MSC18110)

Day & Date: Thursday, 30-04-2026 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) Which diagram shows actual instances of classes at a specific time?
   a) Class diagram b) Object diagram
   c) Sequence diagram d) Component diagram

2) An association in UML indicates _____.
   a) A runtime object
   b) A code module
   c) A relationship between classes
   d) A deployment view

3) Which among these are the common notations for deployment diagrams?
   a) Artifacts and nodes b) Stereotypes
   c) Components d) All of these

4) In object oriented analysis and design _____ is the concept that different objects can respond to the same message in different ways.
   a) Polymorphism b) Generalization
   c) Encapsulation d) Specialization

5) The UML _____ diagram is used to model the static view of a system.
   a) Class b) communication
   c) sequence d) state

6) A _____ diagram provides a framework for constructing the executable software system.
   a) Use Case b) State
   c) Activity d) Deployment

7) Which are building blocks of UML?
   a) Things b) Relationships
   c) Diagrams d) All of these

8) A Class consists of which of this abstraction?
   a) Set of the objects b) Operations
   c) Attributes d) All of these

9) 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

10) Which of the following diagram is time oriented?
   a) Collaboration b) Sequence
   c) Activity d) None of these

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

1) The software development life cycle (SDLC) includes phases like requirements, design, implementation, testing, and maintenance.
2) Stereotypes, tagged values, and constraints are part of UML mechanisms.
3) Association, Aggregation, and Generalization are examples of UML class relationships.
4) Generalization is used to represent a “has-a” relationship.
5) Use case diagrams capture functional requirements and interactions between actors and the system.
6) In collaboration diagrams, objects are represented as nodes, and their interactions are shown as links.

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

a) Explain the principles of modeling in object-oriented design.
b) Describe the software development life cycle (SDLC) with its phases in UML context.
c) What are relationships in class diagrams? Explain with examples.
d) Explain the differences between sequence and collaboration diagrams.

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

a) Describe various mechanisms in UML.
b) Explain the conceptual model of UML with a neat diagram.

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

a) Explain a class diagram showing inheritance, aggregation, and association.
b) Draw the class diagram for the School Management System.

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

a) Explain use case diagrams. Create a use case diagram for a library management system.
b) Draw a collaboration diagram and explain message passing.

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

a) Describe the use of activity diagrams with a neat diagram.

b) Explain the concept of interaction diagrams with an example.

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

a) Explain events and signals with reference to advanced behavioral modeling.

b) Describe modeling techniques used for deployment diagrams.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: March/April - 2026
Java Programming (2318201)

Day & Date: Thursday, 16-04-2026 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 method is used to start a thread execution?
   a) run() b) start()
   c) execute() d) init()

2) _____ class provides method to manipulate strings.
   a) String b) StringBuffer
   c) StringBuilder d) All of these

3) Which of the following package contains the Random class?
   a) java.util b) java.lang
   c) java.io d) java.net

4) Which of the following is used to create a socket in Java?
   a) ServerSocket b) DatagramSocket
   c) Socket d) All of these

5) What is the correct signature of the paint() method in applet?
   a) paint() b) paint(Graphics g)
   c) void paint() d) void paint(String g)

6) _____ class is at the top of the Java class hierarchy.
   a) Object b) System
   c) Class d) String

7) _____ is dynamic method dispatch.
   a) Method overloading b) Compile-time binding
   c) Run-time polymorphism d) Static binding

8) Which interface must be implemented to handle action events?
   a) ActionListener b) MouseListener
   c) WindowListener d) KeyListener

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

1) _____ package contains classes for event handling.
2) Java thread can be created using _____.
3) _____ is the default priority of a thread.
4) _____ class is used for reading characters from a file.

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

a) What is the purpose of the final keyword in Java?
b) Differentiate between interface and abstract class.
c) Differentiate between single and multilevel inheritance.
d) Give the role of DriverManager in JDBC.
e) What is the use of throw and finally keyword?
f) What are wrapper classes?
g) What is purpose of PreparedStatement and CallableStatement in JDBC?
h) What is the purpose of the InetAddress class in Java networking?

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

a) Explain the concept of multithreading with an example.
b) Write a program that handles button click events using ActionListener.
c) Discuss the use of super keyword.
d) List and explain the classes provided by the java.net package for networking.

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

a) Write note on JVM, JRE, and JDK.
b) Write a Java program to create two threads using Runnable interface and display thread names.
c) Describe the lifecycle of an applet with suitable diagrams and methods.

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

a) Describe the role of AWT controls and Layout Managers in building Java GUI applications.
b) Write a program to copy the content of one text file into another text file.
c) Describe the four types of JDBC drivers and their characteristics.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: March/April - 2026
Python Programming (2318202)

Day & Date: Saturday, 18-04-2026 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) NumPy arrays can be _____.
   a) Indexed b) Sliced
   c) Iterated d) All of the mentioned above

2) Django is a _____ Python web framework.
   a) low-level b) mid-level
   c) high-level d) none of the above

3) Which widget are used to get the data from the user?
   a) Entry b) Label
   c) Button d) None of the above

4) For fetch the data which function we use to run select query?
   a) fetch() b) rawquery()
   c) execute() d) excutequery

5) To remove a directory, we can use _____ methods of 'os' module.
   a) removerDir() b) remdir()
   c) rmdir() d) rem_dir()

6) Which Django file contains all the configuration of your Django installation?
   a) main.py b) setting.py
   c) djangosetting.py d) settings.py

7) How many except statements can a try-except block have?
   a) Zero b) One
   c) more than one d) more than zero

8) Which thread method is used to wait until the terminates.
   a) join() b) wait()
   c) run() d) stop()

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

1) In python ____ method is used to execute SQL command.
2) MVC stands for _____.
3) To call super class constructor _____ method is used.
4) To take checkbox ____ widget is used.

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

a) What is radio button?
b) What is inheritance? List out types of inheritance.
c) What is Dictionary? Give an example.
d) What is file? List modes of file.
e) What is histogram graph?
f) What is regular expression?
g) What is Numpy?
h) What is Django?

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

a) What is abstract class? Explain with example.
b) Write a python program to check given number is prime or not by using GUI application.
c) Explain the Django MVC architecture.
d) What is string? Explain methods of string with example.

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

a) What is canvas? Explain with example.
b) Explain the python built -in functions map, zip, reduce and filter with example.
c) Explain the data frame and series with example.

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

a) Explain Django web frame.
b) What is constructor? Explain types of constructor with example.
c) Design GUI that uses Frame,Label,Button,Spinbox,RadioButton, CheckButton widgets.

Seat No.	

Set P

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: March/April – 2026
Computer Communication Network (2318207)

Day & Date: Tuesday, 21-04-2026 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) Packet life time management is implemented by _____.
   a) Data link layer b) Transport layer
   c) Network layer d) Both b) and c)

2) Which of the following is not a service primitive in connection oriented service ?
   a) SEND b) CONNECT
   c) LISTEN d) ACKNOWLEDGE

3) Tunneling at the network layer is most closely associated with which of the following concepts?
   a) Transport layer security b) Data link control
   c) Encapsulation d) Flow control

4) Which of the following is NOT a congestion control technique?
   a) Traffic shaping b) Load shedding
   c) Congestion avoidance d) Cyclic redundancy check

5) In cyclic redundancy checking, the divisor is _____ the CRC.
   a) one bit less than b) one bit more than
   c) The same size as d) none

6) An example for dynamic routing algorithm is _____.
   a) Shortest Path b) Flooding
   c) Dijikstra d) Distance Vector

7) What is the first octet range for a class B IP address?
   a) 128 - 255 b) 1 - 127
   c) 192 - 223 d) 128- 191

8) In OSI model, which of the following layer provides error-free delivery of data?
   a) Data link b) Network
   c) Transport d) Session

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

1) _____ layer is primarily responsible for congestion control.
2) Protocols in which sender sends one frame and then waits for an acknowledge before proceeding are called _____.
3) The checksum of 1111 and 1111 is _____.
4) _____ is the function of a data link layer that provides a way for a sender to transmit a set of bits that are meaningful to the receiver.

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

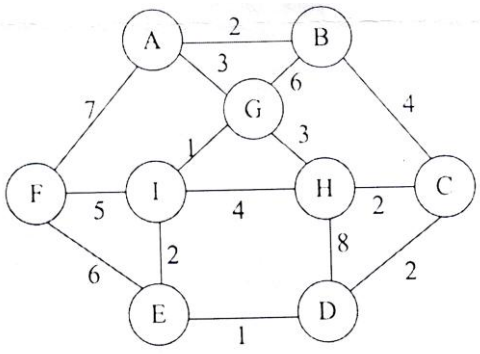
a) What is Dynamic Web Document?
b) What is Pipelining?
c) What is an Internet?
d) What is hamming Distance?
e) What is load shedding?
f) Which are the two general principles of congestion control?
g) What is a LAN?
h) What is tunneling?

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

a) Explain various service primitives.
b) Explain electronic mail message formats.
c) Explain Three Way Handshaking mechanism of TCP.
d) Mention only steps of Link state packet routing algorithm.

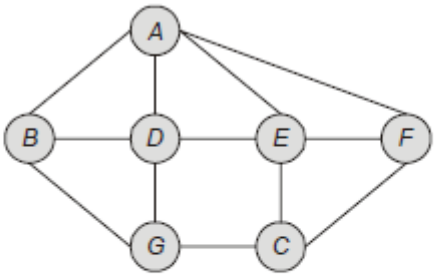
Q.4 Answer the following. (Any Two) **12**

a) Explain Internet Checksum in detail.
b) Classify the computer network according to scale.
c) The distances between different routers are given in the following subnet. Build the sink tree for router A using optimality principle.



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

a) Explain IPv4 datagram in detail.
b) Explain Selective Repeat ARQ protocol in detail.
c) For a given network below, the routing tables of four nodes A, B, E and G are shown. Suppose that D has estimated its delay to its neighbours A, B, E and G as 3, 1, 1 and 1 msec respectively and updates its routing table using distance vector routing technique:



Routing Table of *A*	
A	0
B	4
C	5
D	3
E	4
F	5
G	4

Routing Table of *B*	
A	4
B	0
C	13
D	13
E	12
F	9
G	7

Routing Table of *E*	
A	7
B	2
C	1
D	1
E	0
F	2
G	3

Routing Table of *G*	
A	4
B	2
C	2
D	1
E	3
F	4
G	0

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - II) (New) (NEP CBCS)
Examination: March/April - 2026
Mobile Computing (2318208)

Day & Date: Tuesday, 21-04-2026 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) WAP is ____ suite.
   a) Protocol b) Message
   c) Security d) None of these

2) What is the term used by ITU for a set of global standards of 3G systems?
   a) IMT 2000 b) GSM
   c) CDMA d) EDGE

3) In which one of the following codes with specific characteristics can be applied to the transmission?
   a) CDMA b) GPRS
   c) GSM d) All of the above

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

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

6) Bluetooth is the wireless technology for _____.
   a) local area network b) personal area network
   c) metropolitan area network d) wide area network

7) 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

8) What is wireless communication?
   a) Sending data from one location to with the use of physical medium
   b) Sending data from one location to another without the use of physical medium
   c) Sending data from one location to another without the use of virtual medium
   d) None of the mentioned

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

1) The term "IMEI" stands for the _____.
2) IEEE _____ standard defines the services that need to be provided by the Wireless LAN.
3) PSTN stands for _____.
4) _____ is a packet oriented mobile data service available to users.

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

a) What are the key factors of PCS?
b) Define Roaming.
c) What are the requirements of Wireless LAN?
d) Define Mobile IP.
e) Define Virtual Private Network.
f) Define Piconet.
g) What are the types of Handoffs?
h) Define Power management.

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

a) Write Note on Mobility Management.
b) Write the Applications of Wireless LAN.
c) Write a Note on Network Signaling.
d) Write about the WML.

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

a) Draw and Explain GSM Architecture.
b) Write in detail about the GPRS.
c) Explain GSM Call Origination Operation.

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

a) Explain the case study of the IRIDIUM.
b) Explain the quality of Services (QoS) in 3G.
c) Explain the Architecture of WAP.

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April – 2026
Digital Image Processing (2318301)

Day & Date: Friday, 17-04-2026 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) The process of converting a continuous image into a discrete form is called _____.
   a) Quantization b) Sampling
   c) Filtering d) Coding

2) Which is nonlinear from the following?
   a) Averaging b) Addition
   c) Median filter d) Scaling

3) Histogram equalization improves _____.
   a) Contrast b) Size
   c) Color d) Resolution

4) Gaussian noise is used for _____.
   a) Impulse b) Random noise
   c) Periodic d) Uniform

5) The Hit-or-Miss transformation is defined in terms of _____ structuring, elements.
   a) Zero b) One
   c) Two d) None of these

6) Thresholding is based on _____.
   a) Frequency b) Intensity values
   c) Shape d) Size

7) Decision-theoretic methods use _____.
   a) Probability b) Geometry
   c) Algebra d) Logic gates

8) Object recognition is the final step in _____.
   a) Segmentation b) Image processing pipeline
   c) Filtering d) Coding

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

1) Storage device in DIP system is _____.
2) High-pass filter performs _____.
3) The log transformation is calculated using _____.
4) Watershed algorithm is used for _____.

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

a) Differentiate between sampling and quantization.
b) What are nonlinear operations? Give one example
c) What is histogram equalization?
d) What is the role of the Fourier Transform in image processing?
e) What is morphological image processing?
f) Define opening operation.
g) Explain chain code and shape number with example.
h) What is object recognition?

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

a) Explain three levels of image processing?
b) Explain spatial filtering techniques for image smoothing and sharpening.
c) Explain dilation and erosion operations with examples.
d) Discuss boundary descriptors and regional descriptors.

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

a) Explain the components of an image processing system and their functions.
b) Explain the concept of feature extraction and its role in image processing.
c) An image has a resolution of 512×512 pixels and 8 bits per pixel
i) Calculate the total storage required.
ii) What happens to storage if the resolution is doubled?

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

a) Explain the basic concepts of morphological image processing.
b) Explain frequency domain processing and explain the role of Fourier Transform.
c) Given a grayscale image with intensity levels (0−3) and histogram.

Intensity	Frequency
0	10
1	20
2	30
3	40

i) Compute normalized histogram
ii) Find cumulative distribution function (CDF)
iii) Perform histogram equalization

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April - 2026
Data Warehousing and Data Mining (2318302)

Day & Date: Monday, 20-04-2026 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) _____ predicts future trends & behaviors, allowing business managers to make proactive, knowledge-driven decisions.
   a) Data warehouse b) Data mining
   c) Data marts d) Metadata

2) Multiple numbers of data sources get combined in which step of the Knowledge Discovery?
   a) Data Transformation b) Data Selection
   c) Data Integration d) Data Cleaning

3) DSS in data warehouse stands for _____.
   a) Decision Single System b) Decision Support System
   c) Data Support System d) Data Storable System

4) The important aspect of the data warehouse environment is that data found within the data warehouse is _____.
   a) subject-oriented b) time-variant
   c) integrated d) All of the above

5) The core of the multidimensional model is the _____ which consists of a large set of facts and a number of dimensions.
   a) Multidimensional cube b) Dimensions cube
   c) Data cube d) Data model

6) The process of removing the deficiencies and loopholes in the data is called as ____.
   a) Aggregation of data b) Extracting of data
   c) Cleaning up of data d) Loading of data

7) _____ is a good alternative to the star schema.
   a) Star schema b) Snowflake schema
   c) Fact constellation d) Star-snowflake schema

8) An _____ system is market-oriented and is used for data analysis by knowledge workers, including managers, executives, and analysts.
   a) OLAP b) OLTP
   c) MOLAP d) None of the above

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

1) _____ is a summarization of the general characteristics or features of a target class of data.
2) The output of KDD is _____.
3) ETL stands for _____.
4) The full form of OLAP is _____.

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

a) What is Data Warehouse?
b) What is Data Reduction?
c) What is Data Mining Primitives?
d) What is mean by Predication?
e) Define Outlier Analysis.
f) What is Data Integration?
g) What are Research Prototypes?
h) What is A Data Mining Query Language?

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

a) Why there is a need for data cleaning?
b) Explain the concepts of association rule mining.
c) Explain Trends in Data Mining.
d) Explain Data Cleaning and Data Reduction.

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

a) What is Cluster Analysis? Explain types of data in Cluster Analysis.
b) What is Classification? Explain Bayesian Classification with example.
c) Explain Data cube Technology in data warehouse.

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

a) What is Data Mining? Explain different Data Mining Applications.
b) Explain different Model-Based Clustering Methods.
c) Explain Data Warehouse Architecture with component of data warehouse.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April - 2026
Open Source Technologies (PHP, MySql) (2318306)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

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

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

1) PHP stands for _____.
   a) Personal Home Page
   b) PHP: Hypertext Preprocessor
   c) Private Home Page
   d) Programming Hyper Processor

2) PHP is a _____ scripting language.
   a) Server-side b) Client-side
   c) Compiler-based d) Assembly-based

3) Which of the following is not a PHP operator?
   a) Arithmetic b) Logical
   c) Bitwise d) Reflexive

4) Which loop is used for iterating through arrays in PHP?
   a) foreach b) for
   c) while d) do...while

5) Which function is used to throw an exception in PHP?
   a) throw() b) new Exception()
   c) exception() d) error()

6) Which is a superclass for user-defined exceptions?
   a) Error b) Throwable
   c) Exception d) RuntimeError

7) PHP supports _____ oriented programming.
   a) Procedure b) Object
   c) Both d) None

8) Sessions in PHP are started using _____.
   a) start_session() b) new session()
   c) session_start() d) create_session()

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

1) Server-side scripting runs on the _____.
2) An exception object is created using _____.
3) The method used to send data via URL is _____.
4) The PHP function to connect to MySQL is _____.

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

a) What is Exception handling?
b) List out any four date and time functions.
c) What is constructor used in PHP?
d) What is str_replace(), strcmp()?
e) What is include () and require ()?
f) What is Multidimensional array?
g) How will you connect a MySQL database using PHP?
h) What is GET and POST Methods?

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

a) What is session and cookie? Explain how to read and write cookies with example.
b) Write A PHP script to check given number is prime or not.
c) What are the advantages and disadvantages of PHP?
d) Write PHP script to display indexed array in reverse order.

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

a) Write the PHP code for fetching the data from a database to a webpage.
b) Explain exception handling in detail with example.
c) Write PHP script to sending and receiving email.

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

a) Explain the looping statements used in PHP with example.
b) Explain the any 6 string functions used in PHP with example.
c) Explain the client-side and server-side scripting with example.

Set No.		Set	P

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April - 2026
Artificial Intelligence (2318307)

Day & Date: Wednesday, 22-04-2026 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) _____ is the first operator applied to the population.
   a) Reproduction b) Recombination
   c) Mutation d) none of the above

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) _____ is the well-known Expert System for medical diagnosis systems.
   a) MYSIN b) CADUCEUS
   c) DENDRAL d) SMH.PAL

5) The conversion of a fuzzy set to a single crisp value is called _____.
   a) fuzzification b) defuzzification
   c) fuzzy logic d) fuzzy rule

6) The formula which has all its interpretations recording true is known as a _____.
   a) disjunction b) conjunction
   c) tautology d) antecedent

7) A Neural Network can answer _____.
   a) For Loop questions
   b) what-if questions
   c) IF-The-Else Analysis Questions
   d) None of the above

8) Unsupervised Learning is _____.
   a) learning with the help of examples
   b) learning without a teacher
   c) learning with the help of the teacher
   d) learning with computers as a supervisor

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

1) The reproduction operator is also known as _____.
2) External actions of the agent are selected by _____.
3) The learning method that uses input and the target output to the network is _____.
4) _____ chaining algorithm is known as goal-driven algorithm and is used to solve a problem.

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

a) What are the advantages of Dempster-Shafer Theory?
b) What are the advantages of the A* algorithm?
c) What is the difference between Information Gain and Gini Index?
d) What are the issues in knowledge representation?
e) List out the advantages of Production Systems.
f) What is the difference between Local Maxima and Plateaus?
g) What is Matching in Al?
h) Why is there a need for an Inference Rule?

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

a) What are the different types of agents? Explain in detail.
b) Discuss the breadth-first search technique with the help of an example.
c) Explain the constraint satisfaction problem in Al to solve SEND + MORE = MONEY.
e) Explain Dempster-Shafer's theory.

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

a) Explain the resolution with an example.
b) What is machine learning? Explain the types of machine learning.
c) Explain Bays theorem with example.

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

a) What is an expert system? Explain in detail.
b) Explain the water Jug problem in detail.
c) Explain forward chaining and backward chaining with examples.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April - 2026
Cloud Computing (2318308)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams wherever necessary.
3) Figures to right indicate full marks.

Q.1 A) Multiple choice questions. **08**

1) Cloud Computing denotes a model on which a computing infrastructure is viewed as a "_____" from which businesses and individuals access applications from anywhere in the world on demand.
   a) Data Center b) Cloud
   c) Satellite d) Protocol

2) Computing itself, to be considered fully virtualized, must allow computers to be built from, _____ components such as processing, storage, data, and software resources.
   a) Centralized b) Customized
   c) Digitalized d) Distributed

3) As more and more vendors enter the _____ cloud segment, cloud providers will strive to gain competitive advantage by adopting various optimization strategies or value-added services to the customers.
   a) EaaS b) MaaS
   c) PaaS d) laaS

4) _____ provides customer with a similar offer: it allows users to deploy their own distributed system on top of their virtual infrastructure.
   a) GoldenGrid b) GolfGrid
   c) GuestGrid d) GoGrid

5) _____ allows developing scalable applications for the cloud.
   a) Azare b) Azuer
   c) Azure d) Azuret

6) _____ allows customers to reach their applications securely without having to employ complex back-end configurations like VPN's.
   a) Sensor Socket b) Software Socket
   c) System Software d) Secure Socket

7) _____ provides network-based access to commercially available software.
   a) PaaS b) IaaS
   c) SaaS d) CaaS

8) Cloud platform management includes _____.
   a) Resource allocation, auto-scaling, load balancing
   b) Local storage installation
   c) Manual software installation by users
   d) Non-virtualized servers

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

1) SOA stands for Service Oriented Architecture.
2) All services are allocated in a “cloud” that actually is a collection of devices and resources connected through the Internet.
3) Google App Engine is a development platform and a runtime environment focusing primarily on web applications that will be run on top of Google’s server infrastructure.
4) By using Eucalyptus, users can not test and deploy their cloud applications on the private premises and naturally move to the public virtual infrastructure provided by Amazon EC2 and S3 in a complete non transparent manner.

Q.2 Solve any Six of the following. **12**

a) List any two characteristics of cloud computing.
b) What is a public cloud?
c) What is a hypervisor?
d) What is a machine image in IaaS?
e) What is a web service in cloud computing?
f) Define Platform as a Service (PaaS).
g) Name one tool used for network-level security.
h) What is Storage as a Service (StaaS)?

Q.3 Attempt any Three of the following. **12**

a) Discuss insider threats and how they can impact cloud security.
b) Define Cloud Computing and describe its main components.
c) What is Intranet and Internet?
d) Discuss in detail differences between on-premises versus cloud computing.

Q.4 Attempt any Two of the following. **12**

a) What is Hybrid Cloud?
b) What is a hypervisor? Describe its role in managing virtual machines in IaaS.
c) State and explain various Cloud Deployment Model.

Q.5 Attempt any Two of the following. **12**

a) What is PaaS? State and explain characteristics of Google App Engine?

b) Explain Storage as a Service (StaaS) and discuss its advantages for cloud customers.

c) Discuss in detail differences between on-premises versus cloud computing system?

Seat No.		Set	P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: March/April - 2026
Machine Learning (2318401)

Day & Date: Thursday, 16-04-2026 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 alternative given below. 08

1) _____ is programming computers to optimize a performance criterion using example data or past experience.
   a) Machine Learning b) Data Learning
   c) Past Learning d) Performance

2) In finding an _____ rule, that means learning a conditional probability.
   a) Knowledge b) Association
   c) Governing d) Probabilistic

3) A rule that fits the past data, if the future is similar to the past, then researchers can make correct _____ for novel instances.
   a) Analysis b) Design
   c) Testing d) Predictions

4) A robot navigating in an environment in search of a goal location is another application area of _____ learning.
   a) Law-enforcement b) Reinforcement
   c) Capital d) Resource

5) Machine Learning application areas like _____, speech, and robotics are also tasks that are best learned from sample data.
   a) Mission b) Goal
   c) Vision d) Skeptical

6) Bayesian formalism allows us to define our _____ information on the hidden factors and the model, as well as to infer the model parameters.
   a) Post b) Post preview
   c) Prior d) Pin-drop

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

8) _____ is an unsupervised method in that component analysis does not use the output information; the criterion to be maximized is the variance.
   a) Principal Component Analysis (PCA)
   b) Principle Cabin Analysis (PCA)
   c) Princi-procal Compartment Analysis (PCA)
   d) Principal Condition Analysis (PCA)

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

1) Learning can be viewed as the task of searching through a large space of hypotheses implicitly defined by the hypothesis representation.
2) Decision tree learning is a method for approximating discrete-valued target functions,
3) KNN learning is primarily used for clustering data points and grouping them into a specified number of clusters.
4) 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.

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

a) What is Artificial Intelligence?
b) Define Supervised Learning?
c) What is a Decision Tree?
d) Define Prior Probability?
e) What is Conditional Independence?
f) What is a Random Forest Algorithm?
g) What is Dimension Reduction?
h) What is Reinforcement Learning?

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

a) State and Explain concept of Support Vector Machine (SVM).
b) Explain in brief Machine Learning versus Deep Learning.
c) What is Unsupervised Learning?
d) What do you mean by PCA?

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

a) What do you mean by Euclidean Distance? Explain the working of K-Nearest Neighbor Algorithm with suitable examples.
b) State and explain the difference between Supervised and Unsupervised Learning.
c) What do you mean by Market Basket Analysis? Explain Association rule using Apriori Algorithm with suitable example.

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

a) What do you mean by Machine Learning? State various applications of Machine Learning.

b) State and explain steps of K-Means Clustering with following:
Given Points : M (2, 2), N(3, 2), P(1, 1), Q(3, 1), R(1.5, 0.5) and with initial cluster points (2,2) and (1,1).

c) State and differentiate between Linear versus Logistic Regression.

Seat No.		Set	P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: March/April - 2026
Network Security (2318402)

Day & Date: Saturday, 18-04-2026 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) _____ : A legitimate user who accesses data, programs, or resources for which such access is not authorized, or who is authorized for such access but misuses his or her privileges.
   a) Misfeasor b) Clandestine user
   c) Masquerader d) None of these

2) TCP stands for _____.
   a) Transmission Control Protocol
   b) Transform Communication Payload
   c) Transit Control Pay
   d) Transmission Closed Parameter

3) _____ is the ability to limit and control the access to host systems and applications via Communications links.
   a) Data Confidentiality b) Data Integrity
   c) Access control d) Nonrepudiation

4) _____ prevents either sender or receiver from denying a transmitted message.
   a) Data Confidentiality b) Nonrepudiation
   c) Access control d) Data Integrity

5) _____ determines the types of Internet services that can be accessed, inbound or outbound.
   a) Service control b) Direction control
   c) User control d) Behavior control

6) _____ determines the direction in which particular service requests may be initiated and allowed to flow through the firewall.
   a) Service control b) Behavior control
   c) User control d) Direction control

7) A _____ model is used to establish transition probabilities among various states.
   a) multivariate b) operational
   c) Markov process d) time series

8) _____ : The way in which an object is accessed by a subject

a) Object b) Subject
c) Access right d) None of these

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

1) Security service is a processing or communication service that enhances the security of the data processing systems and the information transfers of an organization.
2) A masquerade takes place when one entity pretends to be a different entity.
3) A stream cipher processes the input one block of elements at a time, producing an output block for each input block.
4) Kerberos is a key distribution and user authentication service developed at MIT.

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

a) What is masquerade?
b) Explain in short Data confidentiality.
c) Explain ACL capabilities.
d) What is Key Escrow? Explain in short.
e) What is cryptanalysis? Explain in short.
f) Explain the use of hash function.
g) What are the different policies to set strong password?
h) Explain the importance of firewall.

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

a) What is biometric? Explain the use of it with example.
b) What is digital signature? Explain the use of digital signature.
c) Explain Model for Network security with well labelled diagram.
d) Explain HRU model with example.

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

a) What is Security Association (SA)? Explain various security association parameters.
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 Attack? Explain different types of Active attacks.
b) Explain DES algorithm with suitable example.
c) What is intruder? Explain three classes of intruders.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: March/April - 2026
Net Technology (2318405)

Day & Date: Tuesday, 21-04-2026 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) C# runs on the _____.
   a) .NET Framework b) Java Virtual Machine
   c) Both a and b d) None of the above

2) What is CLR in C#?
   a) It is a virtual machine component of JVM
   b) It is a compiler to compiler the C# code
   c) It is a virtual machine component of Microsoft .NET Framework
   d) All of the above

3) Which of the following property is used to get cookies value in ASP.NET?
   a) Response.Cookies["cookiename"].GetValue
   b) Response.Cookies["cookiename"].CookieValue
   c) Response.Cookies["cookiename"].GetCookieValue
   d) Response.Cookiesf'cookiename"].Value

4) Choose the correct option about DataReader object.
   a) DataReader object is a forward-only object
   b) It provides connection oriented environment
   c) DataReader is read only object
   d) All of the these

5) Which of the following is not an ASP.NET page event?
   a) Init b) Load
   c) Import d) None of the above

6) The _____ state technique maintain data across users.
   a) Application b) Session
   c) Cookies d) Query String

7) The _____ directive's duration attribute determines how long the page is cached.
   a) @Cache b) @OutputCache
   c) @OutCache d) @PageCach

8) What is the full form ASP?
   a) Access Server Pages
   b) Active Service Pages
   c) Active Server Pages
   d) Access Service Pages

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

1) The AutoPostBack is a property for web controls in ASP.NET
2) C# programming language is not case-sensitive.
3) Every Server control of ASP.NET must have an id.
4) There is no private or protected inheritance in C#.NET.

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

a) Web Page in ASP.NET.
b) Need of Master Pages.
c) Define CTS and explain its role in .NET.
d) What is the purpose of metadata in .NET assemblies?
e) What is the role of JIT compiler in .NET?
f) What is Session State in .NET?
g) Mention two techniques for state management in ASP.NET.
h) What is the use of ViewState in ASP.NET?

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

a) What is boxing and unboxing? Explain with example.
b) Explain CompareValidator Control in asp.net with example.
c) Explain global.asax file in detail.
d) Explain the overview of HTTP Handler & Modules.

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

a) Explain all validation controls used in ASP.Net with example.
b) Explain ASP.net page life cycle.
c) What is .NET framework? Explain components of .NET Framework.

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

a) What is the ASP.Net directive? Explain different directives used in ASP.Net.
b) What is cookies? Explain cookies in detail.
c) What are nested master pages? Explain event ordering in master pages.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: March/April – 2026
Block Chain Technology (2318406)

Day & Date: Tuesday, 21-04-2026 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) Blockchain is a peer-to-peer _____ distributed ledger technology that makes the records of an 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 purpose of a nonce?
   a) Follows nouns
   b) A hash function
   c) Sends information to the blockchain network
   d) Prevents double spending

6) What is Proof of Stake?
   a) certificate needed to use the blockchain
   b) password needed to access an exchange
   c) How private keys are made
   d) transaction and Block Verification Protocol

7) What is a smart contract??
   a) Programs stored on a blockchain that run when predetermined conditions are met
   b) Online contract
   c) Digital contract
   d) All the above

8) If a hacker wanted to alter a blockchain, what percentage of the block copies would he have to alter?
   a) Only his copy b) 1%
   c) 51% d) 100%

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

1) Ralph Merkle invented Merkle Trees.
   a) True b) False
2) Hash function is takes an input of any length and returns a fixed-length string of numbers and letters.
   a) True b) False
3) Wallet is popularly used for storing cryptocurrency token?
   a) True b) False
4) blockchain is not decentralized ledger.
   a) True b) False

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

a) Sharding.
b) zk-SNARK.
c) Privacy Issues in Blockchain.
d) Smart Contract.
e) Node in blockchain.
f) Solidity.
g) Blockchain Attacks.
h) Features in Blockchain 3.

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

a) Decentralized distributed technology.
b) Explain Proof of work and Proof of Stake.
c) Difference between Permissioned Blockchain and Permission less Blockchain.
d) What is smart contract? How Turing Completeness work in Smart Contract Language?

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

a) State difference between Proof of Work (PoW) and Proof of Stake (PoS).
b) What are Security issues in Blockchain? Explain in detail.
c) Explain blockchain 3.0 with Hyperledger fabric.

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

a) What is digital cash? Explain advantages and disadvantages.

b) What are advanced technologies introduced in blockchain 2.0?

c) Explain Bitcoin Scripting language and their use.

Seat No.	

Set | P

M.Sc. (Computer Science) (Semester - IV) (New) (NEP CBCS)
Examination: March/April - 2026
Soft Computing (2318407)

Day & Date: Tuesday, 21-04-2026 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 is associated with fuzzy logic?
   a) Crisp set logic b) Many-valued logic
   c) Two-valued logic d) Binary set logic

2) Uncertainty can be represented by _____.
   a) Entropy b) Fuzzy logic
   c) Probability d) All of the above

3) In artificial neural network, interconnected processing elements are termed as _____.
   a) Weights b) Nodes or neurons
   c) Axon d) Soma

4) Which of the following is not a specified method used for selecting the parents?
   a) Tournament Selection b) Steady-state
   c) Elitism d) Boltzmann selection

5) Matrix Crossover is also known as _____.
   a) One dimensional b) Two dimensional
   c) Three dimensional d) None of the above

6) Fuzzy Computing ____.
   a) Mimics Human Behaviour
   b) Does not deal with two valued logic
   c) Deals with information which is vague, imprecise and uncertain
   d) All of the above

7) The cardinality of Fuzzy Set is ____.
   a) 0 b) Finite
   c) Infinite d) None of these

8) How are fuzzy measures utilized in fuzzy systems?
   a) To determine exact measures
   b) To represent vague quantities
   c) To perform crisp calculations
   d) To eliminate uncertainty

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

1) A Fuzzy logic is an extension to the Crisp set, which handles the Partial Truth.
2) Like relational databases there does exists fuzzy relational databases.
3) Artificial neurons are capable enough to model original neurons networks similarly as they are found in the human brain.
4) Traditional set theory is also known as Crisp Set theory.

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

a) What is Hidden Layer?
b) What do you mean by Crisp Set?
c) What is Neuron?
d) Define Fuzzy Logic.
e) What is Mutation?
f) What is Alpha cut?
g) What is Hard Computing?
h) Define Genetic Algorithm.

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

a) State the various characteristics of Artificial Neural Network.
b) What do you mean by Fuzzy Intersections?
c) What do you mean by Fitness Function?
d) Explain in brief Fuzzy Equivalence Relations.

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

a) Define Soft Computing. Explain in detail architecture and learning mechanism of back propagation networks.
b) Explain Genetic Representation using various types of encoding with suitable example.
c) State and differentiate between Fuzzy Set versus Crisp Set.

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

a) Define Artificial Neural Networks. Explain in detail various Models of Artificial Neuron.
b) Define Fuzzy Relations. State various types of Fuzzy Set Operations with suitable example.
c) Explain in detail various Learning methods for Artificial Neural Computing.

Seat No.	

Set P

M.Sc. (Computer Science) (Sem - II) (New) (CBCS) Examination: March/April – 2026
Statistical Methods (MSC16208)

Day & Date: Thursday, 16-04-2026 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) Which measure of central tendency is determined graphically by ogives?
   a) Mean b) Median
   c) Mode d) Geometric Mean

2) A positively skewed distribution has _____.
   a) Mean $<$ Median $<$ Mode
   b) Mean $=$ Median $=$ Mode
   c) Mean $>$ Median $>$ Mode
   d) Mode $>$ Mean $>$ Median

3) Kurtosis measures the _____.
   a) Symmetry of data
   b) Central value
   c) Peakedness of distribution
   d) Dispersion of data

4) If the correlation coefficient is zero, then the variables are _____.
   a) Perfectly positively correlated
   b) Perfectly negatively correlated
   c) Uncorrelated
   d) Equal

5) Regression coefficients are used to estimate _____.
   a) Variance b) One variable from another
   c) Probability d) Median

6) In a Bernoulli distribution, the random variable can take values _____.
   a) 0 and 1 b) 1 and 2
   c) Any real number d) -1 and $+1$

7) Which distribution approaches Normal distribution for large sample size?
   a) Uniform Distribution b) Binomial Distribution
   c) Exponential Distribution d) Bernoulli Distribution

8) The exponential distribution is commonly used to model _____.
   a) Number of successes b) Time between events
   c) Rank correlation d) Grouped data

9) Failing to reject a false null hypothesis is called _____.
   a) Type-I Error b) Type-II Error
   c) Sampling Error d) Standard Error

10) Sign test is based on _____.
   a) Numerical magnitudes of differences
   b) Signs of differences only
   c) Variances only
   d) Means only

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

1) The sum of all observations divided by the number of observations is called the _____.
2) The difference between the maximum and minimum values is called the _____.
3) Karl Pearson's coefficient of correlation lies between _____ and _____.
4) The regression line is used to estimate one variable from _____.
5) The probability of an impossible event is _____.
6) The level of significance is usually denoted by _____.

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

a) Explain Range and Quartile Deviation as measures of dispersion.
b) Define regression. State the two lines of regression.
c) State the addition and multiplication laws of probability.
d) What are Type-I and Type-II errors? Explain with examples.

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

a) Explain Chi-square test for independence of attributes with suitable example.
b) Define uniform distribution over (a, b). If X follows $U(0,2)$, then find:
   i) $P(X > 1.5)$
   ii) $P(X < 0.6)$

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

a) Give classical definition of probability. Also explain addition and multiplication rule of probability.
b) Explain the concept of correlation. Also explain types of correlation.

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

a) Explain the following:

i) Run test

ii) Sign test

b) Explain, in detail, the test for testing equality of means of two populations.

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

a) Discuss signed rank test in detail.

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.7 Answer the following. **16**

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

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

Seat No.	

Set **P**

M.Sc. (Computer Science) (Semester - III) (New) (NEP CBCS)
Examination: March/April – 2026
Applied Statistics (MSC16308)

Day & Date: Wednesday, 22-04-2026 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) A time series is a set of observations arranged according to _____.
   a) Size b) Alphabetical order
   c) Time order d) Magnitude

2) Which of the following is not a component of time series?
   a) Trend b) Seasonal variation
   c) Dispersion d) Cyclical variation

3) In simple random sampling, every unit has _____.
   a) Zero chance b) Equal chance of selection
   c) Double chance d) Unequal chance

4) Laspeyres price index uses _____.
   a) Current year quantities b) Base year quantities
   c) Average quantities d) No quantities

5) Fisher's index number is called _____.
   a) Weighted index b) Ideal index
   c) Cost index d) Quantity index

6) Crude Birth Rate is expressed per _____.
   a) 100 population b) 1000 population
   c) 10 population d) 10000 population

7) Net Reproduction Rate measures _____.
   a) Total births b) Female births replacing mothers
   c) Male births d) Death rate

8) Mean chart is a control chart for _____.
   a) Attributes b) Variables
   c) Defects d) Defectives

9) p-chart is used for monitoring _____.
   a) Fraction defective b) Number of defects
   c) Range d) Average

10) Moving average method is used to measure _____.
   a) Seasonal variation b) Trend
   c) Random variation d) Dispersion

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

1) The long-term movement in time series is called _____.
2) Sampling error arises due to _____ observations.
3) Paasche's index uses _____ year quantities as weights.
4) Total Fertility Rate is the sum of _____ fertility rates.
5) c-chart is used for number of _____.
6) Fisher's index satisfies _____ and factor reversal tests.

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

a) State the components of time series.
b) Explain advantages of sampling over census method.
c) Define Consumer Price Index Number.
d) What are chance causes and assignable causes?

Q.3 Answer the following.

a) Explain additive and multiplicative models of time series. **08**
b) Explain simple random sampling with replacement and without replacement. **08**

Q.4 Answer the following.

a) Calculate trend values by moving average method from suitable data. **08**
b) Explain Laspeyres, Paasche's and Fisher's index numbers. **08**

Q.5 Answer the following.

a) Explain base shifting, splicing and deflating of index numbers. **08**
b) Define and explain Crude Death Rate, Specific Death Rate and Standardized Death Rate. **08**

Q.6 Answer the following.

a) Explain Crude Birth Rate, General Fertility Rate and Age Specific Fertility Rate. **08**
b) Explain Gross Reproduction Rate and Net Reproduction Rate. **08**

Q.7 Answer the following.

a) Explain control charts for variables: Mean chart and Range chart. **08**
b) Explain p-chart, np-chart and c-chart with construction procedure. **08**