

<b>Seat No.</b>	
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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022  
COMPUTER SCIENCE**

**Object Oriented Programming Using C++**

Day & Date: Monday, 13-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

**Q.1 A) Choose Correct Alternative. 10**

- 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 */`

- 9) What is Inheritance in C++?
- a) Wrapping of data into a single class
  - b) Deriving new classes from existing classes
  - c) Overloading of classes
  - d) Classes with same names
- 10) How many specifiers are used to derive a class?
- a) 1
  - b) 2
  - c) 3
  - d) 4

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

- 1) Each byte in memory is assigned a unique \_\_\_\_\_.
- 2) The \_\_\_\_\_ operator can be used to determine 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 \_\_\_\_\_.
- 5) Members of a class are called \_\_\_\_\_.
- 6) Member functions of a class are called \_\_\_\_\_ or \_\_\_\_\_.

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

- 1) Define Encapsulation and Data hiding.
- 2) Define Data members.
- 3) What do you mean by a token?
- 4) Differentiate between keyword and identifier

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

- a) Write down the syntax and example to create a class.
- b) What do you mean by operator precedence?

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

- a) What are the features of Object oriented programming?
- b) Explain use of friend function with the help of suitable example

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

- 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.

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

- a) State any four points of differentiation between compile time polymorphism and run time polymorphism
- b) Differentiate between do..while and while loops on the basis of syntax.

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

- a) Write a C++ program to overload area() function to calculate area of shapes like triangle ,square, circle.
- b) Demonstrate hybrid inheritance with the help of suitable example.

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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Advanced DBMS**

Day & Date: Tuesday, 14-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

**Instructions:** 1) Q. Nos. 1 and 2 are compulsory.  
2) Attempt any Three questions from Q.3 to Q.7  
3) Figures to the right indicate full marks.

**Q.1 A) Choose Correct Alternative. 10**

- 1) Which one of the following is used to define the structure of the relation, deleting relations and relating schemas?
  - a) DDL (Data Definition Language)
  - b) DML (Data Manipulation Language)
  - c) Query
  - d) Relational Schema
- 2) The number of attributes in relation is called as its
  - a) Cardinality
  - b) Degree
  - c) Tuples
  - d) Entity
- 3) The database administrator who authorizes all the new users, modifies the database and takes grants privilege is
  - a) Super user
  - b) Administrator
  - c) Operator of operating system
  - d) All of the mentioned
- 4) AS' clause is used in SQL for
  - a) Selection operation
  - b) Rename operation
  - c) Join operation
  - d) Projection operation.
- 5) INSERT INTO EmpVALUES (102, 'Sagar', 'Computer',66000); What type of statement is this?
  - a) Query
  - b) DML
  - c) Relational
  - d) DDL
- 6) In SQL the spaces at the end of the string are removed by \_\_\_\_\_ function.
  - a) Upper
  - b) String
  - c) Trim
  - d) Lower
- 7) \_\_\_\_\_ Clause is an additional filter that is applied to the result.
  - a) Having
  - b) Group-by
  - c) Select
  - d) Order by
- 8) The primary key must be
  - a) Unique
  - b) Not null
  - c) Both Unique and Not null
  - d) Either Unique or Not null
- 9) How can we specify a row-level trigger?
  - a) Using ON ROW
  - b) Using FOR EACH COL
  - c) Using OR ROW
  - d) Using FOR EACH ROW

- 10) SQL Stands for
- a) Schema Query Language
  - b) Structured Query Language
  - c) Self-Query Language
  - d) None

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

- 1) Information is processed data.
- 2) Database is a software for creating and managing databases.
- 3) A transaction is a unit of work that is performed against a database.
- 4) Table is the basic data storage unit in a Relational database.
- 5) In an enterprise-class database system, business users interact directly with database applications, which directly access the database data.
- 6) Structured Query Language (SQL) is an internationally recognized standard language that is understood by all commercial database management system products.

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

- a) Explain the concept of Data independence.
- b) Differentiate between where clause and group by clause
- c) Explain about different DML operations.
- d) What is a normal form? List the various normal forms.

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

- a) What is Data Model? List and explain various data models used for database design.
- b) What is functional dependency? Explain its usage in database design.

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

- a) Explain the merits and demerits of data base system.
- b) Discuss in detail the operators SELECT, PROJECT, UNION with suitable example.

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

- a) Define the following terms and give examples.
  - 1) Cardinality
  - 2) unary relationships
  - 3) aggregation
  - 4) specialization
- b) Describe the architecture for the Distributed database with necessary diagrams.

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

- a) Define transaction and explain desirable properties of transactions.
- b) What is Database Recovery? Explain different recovery techniques.

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

- a) What is a trigger? How to create it? Give an example of trigger.
- b) What is 2-phase locking protocol? Compare 2PL with Strict 2PL protocol.

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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Data Structures and Algorithms**

Day & Date: Wednesday, 15-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

**Instructions:** 1) Q. Nos.1 and 2 are compulsory.  
2) Attempt any Three questions from Q.3 to Q.7  
3) Figures to the right indicate full marks.

**Q.1 A) Choose Correct Alternative. 10**

- 1) Queue overflow condition occurs while performing \_\_\_\_\_ operation.
  - a) Status
  - b) Remove
  - c) Insert
  - d) is empty
- 2) \_\_\_\_\_ is the prefix of infix expression  $(a * b) \% c$ 
  - a)  $\%abc$
  - b)  $*ab\%c$
  - c)  $\%* abc$
  - d)  $\%ab*c$
- 3) A directed graph is \_\_\_\_\_ if there is a path from each vertex to every other vertex in the digraph.
  - a) Weakly connected
  - b) Strongly Connected
  - c) Tightly Connected
  - d) Linearly Connected
- 4) In what tree, for every node the height of its left sub tree and right sub tree differ at least by one
  - a) Binary search tree
  - b) AVL tree
  - c) Threaded binary tree
  - d) complete tree
- 5) A linear list in which each node has pointers to point to the predecessor and successors nodes is called as \_\_\_\_\_.
  - a) Singly Linked List
  - b) Circular Linked List
  - c) Doubly Linked List
  - d) Linear Linked List
- 6) What is the order of a matrix?
  - a) Number of rows X number of columns
  - b) number of columns X number of rows
  - c) number of rows X number of rows
  - d) number of columns X number of columns
- 7) Selection sort first finds the \_\_\_\_\_ element in the list and put it in the first position.
  - a) Middle element
  - b) Largest element
  - c) Last element
  - d) Smallest element
- 8) The data structure required for Breadth First Traversal on a graph is?
  - a) Stack
  - b) Array
  - c) Queue
  - d) Tree
- 9) The complexity of merge sort algorithm is
  - a)  $O(n)$
  - b)  $O(\log n)$
  - c)  $O(n^2)$
  - d)  $O(n \log n)$

- 10) Heap can be used as \_\_\_\_\_.  
a) Priority queue                      b) Stack  
c) A decreasing order array        d) Normal Array

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

- 1) ADT stands for Abstract data type.
- 2) Queue is liner data structure.
- 3) Stack follows LIFO principle.
- 4) A graph is collection of vertices and edges.
- 5) The time complexity of bubble sort algorithm is  $O(n^2 \log n)$ .
- 6) In post order traversal of binary tree right sub tree is traversed before visiting root.

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

- 1) Explain bubble sort with example.
- 2) What is height balance tree?
- 3) What is D-queue? What are the applications of queue?
- 4) What is a sparse matrix? Explain with suitable example.

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

- a) Write a program for implementation of stack.
- b) Explain radix sort algorithm with example.

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

- a) What is binary tree? Explain types of binary tree.
- b) Explain tree traversal algorithm with example.

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

- a) Write a program for binary search method.
- b) What is linked list? Explain types of linked list.

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

- a) What is graph? Explain linked representation of graph.
- b) What is array? Explain types of array with example.

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

- a) Write an algorithm for converting infix expression to prefix expression.
- b) Write an algorithm for inserting and deleting an element from circularly linked list?

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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022**  
**(COMPUTER SCIENCE)**  
**Software Engineering**

Day &amp; Date: Thursday, 16-02-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

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

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

- 1) \_\_\_\_\_ is the main intent of project metrics.
  - a) For strategic purposes
  - b) To minimize the development schedule
  - c) To evaluate the ongoing project's quality on a daily basis
  - d) To minimize the development schedule and evaluate the ongoing project's quality on a daily basis
- 2) Unit testing is done by \_\_\_\_\_.
  - a) Customer
  - b) User
  - c) Developer
  - d) None of the above
- 3) \_\_\_\_\_ in system modeling depicts the dynamic behavior of the system.
  - a) Context Model
  - b) Behavioral Model
  - c) Data Model
  - d) Object Model
- 4) Software Engineering:
  - a) Is a set of rules about developing software products
  - b) Has been around as a discipline since the early 50's
  - c) Started as a response to the so-called 'Software Crisis' of the late 90's
  - d) Is an engineering discipline concerned with all the aspects of software production
- 5) Size and Complexity are a part of \_\_\_\_\_.
  - a) Process Metrics
  - b) Product Metrics
  - c) Project Metrics
  - d) All of the mentioned
- 6) To handle change & rework request another process called \_\_\_\_\_ is used.
  - a) Software configuration control process
  - b) Software configuration process
  - c) Software configuration management process
  - d) Software engineering process group
- 7) A quantitative measure of the degree to which a system, component, or process possesses, a given attribute is called as \_\_\_\_\_.
  - a) Measure
  - b) Metric
  - c) Indicators
  - d) Software

- 8) \_\_\_\_\_ of the following is/are White box technique.  
 a) Statement Testing      b) Decision Testing  
 c) Condition Coverage      d) All of the mentioned
- 9) \_\_\_\_\_ is a test case design method that exercises the logical conditions contained in a program module.  
 a) Loop testing      b) Unit testing  
 c) Condition testing      d) None of these
- 10) \_\_\_\_\_ is performed to demonstrate to the client, on the real life data of the client.  
 a) Unit testing      b) System testing  
 c) Integration testing      d) Acceptance testing

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

- 1) Software is a product and can be manufactured using the same technologies used for other engineering artifacts.
- 2) Planning ahead for software reuse reduces the cost and increases the value of the systems into which they are incorporated.
- 3) Software engineering team structure is independent of problem complexity and size of the expected software products.
- 4) In collaborative development environments, metrics are used to reward and punish team members.
- 5) ERD enables a software engineer to identify data objects and their relationships using a graphical notation.
- 6) White Box testing sometimes called glass-box testing.

**Q.2 Write Short Note on.****16**

- a) FTR
- b) ERD
- c) Transaction Mapping
- d) Unit Testing

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

- a) What is Software Engineering? Explain different development phases in Software Engineering.
- b) What is DFD? Explain with one example.

**Q.4 Answer the Following.****16**

- a) Explain Software Prototyping in detail.
- b) Explain data, functional and behavioral modeling in detail.

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

- a) What is data design? Explain in detail.
- b) Explain Abstraction and Refinement concept in detail.

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

- a) What is Black-Box testing? Explain in detail.
- b) What is object oriented analysis in detail?

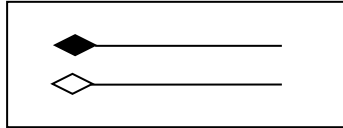
**Q.7 Answer the following.****16**

- a) Explain Waterfall model in detail.
- b) Explain different myths in software engineering.



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- 9) Which UML diagram is shown below?
- a) Deployment diagram                      b) Collaboration Diagram  
c) Object Diagram                            d) Class Diagram
- 10) What type of core-relationship is represented by the symbol in the figure below?



- a) Aggregation                                      b) Dependency  
c) Generalization                                  d) Association

**B) State True or False**

**06**

- 1) Attributes are the data that represents characteristics of interest about an object.
- 2) An object class is a set of object instances that share the same attributes and behavior.
- 3) Behavior is the packaging of several items together into one unit.
- 4) Class diagrams model how events can change the state of an object class over its lifetime.
- 5) An activity diagram can be used to model logic with the system
- 6) An abstract use case represents a form of "reuse."

**Q.2 Answer the following:**

**16**

- a) What is transition?
- b) What is Conceptual model of UML?
- c) What is Events and signals?
- d) What is use case?

**Q.3 Answer the following:**

**16**

- a) Explain in Details Conceptual Modeling.
- b) Explain about the architecture of the UML.

**Q.4 Answer the following**

**16**

- a) Write about deployment diagrams. How to model a fully distributed system?
- b) Explain class Diagram with example.

**Q.5 Answer the following**

**16**

- a) Explain various phases of Software development Life cycle.
- b) Explain Interaction Diagram with example.

**Q.6 Answer the following**

**16**

- a) Write about deployment diagrams. How to model a fully distributed system?
- b) Explain Sequence Diagram with example.

**Q.7 Answer the following**

**16**

- a) Explain structural things in UML.
- b) What is a package? Explain importing and exporting in packages.

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- 10) Native-protocol pure Java converts \_\_\_\_\_ into the \_\_\_\_\_ used by DBMSs directly.
- a) JDBC calls, network protocol
  - b) ODBC class, network protocol
  - c) ODBC class, user call
  - d) JDBC calls, user call

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

- 1) String is the wrapper class.
- 2) The ++ operator is concatenate two strings.
- 3) If m and n are 'int' type variables, then result of the expression m % n when m = 5 and n = 2 is 0.
- 4) If a variable is declared final, it must include initial value.
- 5) It is an important feature of java that it always provides a default constructor to a class.
- 6) A Boolean expressions are valid for an 'if' statement.

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

- 1) Looping statements
- 2) Wrapper classes
- 3) Extending Interfaces
- 4) InetAddress class

**Q.3 Answer the following:**

- a) What is Exception? Explain any three built-in exceptions. **10**
- b) How to define a package? How to access, import a package? Explain with example. **06**

**Q.4 Answer the following.**

- a) What is constructor? Explain types of constructors. **10**
- b) Explain thread life cycle. **06**

**Q.5 Answer the following.**

- a) Explain user-defined exception handling with suitable example. **10**
- b) Define a Stream. Differentiate between a byte-oriented and a character-oriented stream. **06**

**Q.6 Answer the following.**

- a) What do you mean by synchronization? Explain with example. **10**
- b) Explain Event Delegation Model in detail. **06**

**Q.7 Answer the following.**

- a) State features of the layout manager BorderLayout and explain how to implement it. **10**
- b) Write a program for Array index out of bounds type of exception. **06**

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

- 1) In python \_\_\_\_\_ method is used to execute SQL Command
- 2) \_\_\_\_\_ feature of OOP is used to hide internal details and show only functionalities.
- 3) Django is a \_\_\_\_\_ Python Web framework.
- 4) The full form of WSGI is \_\_\_\_\_.
- 5) To install pandas module \_\_\_\_\_ command is used.
- 6) To take checkbox \_\_\_\_\_ widget is used.

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

- a) Define List. Explain any four functions of list.
- b) Explain the use of raise keyword with example.
- c) Explain any four functions of math module.
- d) Write about various types of file opening modes.

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

- a) What are Canvas Container? Explain how to draw line, oval, rectangle and polygon on Canvas container.
- b) Explain the different steps for connecting python application to database.

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

- a) Write a python application to demonstrate difference between instance method, class method and static method.
- b) Explain the different ways of creation of thread with example.

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

- a) What is DataFrame? Write the features of DataFrame. Explain how to create a DataFrame from an Excel Spreadsheet.
- b) What is numpy module? Explain indexing and slicing operations on numpy array.

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

- a) Explain different GUI Layout management methods.
- b) What are the features of pandas module? Write a difference between pandas Series and DataFrame.

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

- a) Explain Django templates to create a template, modify view and change settings.
- b) Explain the python built-in functions map, reduce and filter with example.

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# Computer Communication Network

Max. Marks: 80

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

**Q.1 A) Choose Correct Alternative.**

10

- 1) A set of layers and protocols is called a \_\_\_\_\_.  
a) Protocol  
b) Network architecture  
c) Protocol stack  
d) Interface
- 2) \_\_\_\_\_ of the following device is used to connect two systems, especially if the systems use different protocols.  
a) Repeater  
b) Gateway  
c) Bridge  
d) Hub
- 3) "Parity bits" are used for \_\_\_\_\_.  
a) Encryption of data  
b) To transmit faster  
c) To detect errors  
d) To identify the user
- 4) In OSI model, \_\_\_\_\_ layer provides dialog control and token management.  
a) Session  
b) Transport  
c) Network  
d) Data link
- 5) The device operation at data link layer is \_\_\_\_\_.  
a) Repeater  
b) Router  
c) Bridges  
d) Protocol
- 6) ICMP is mainly used for \_\_\_\_\_.  
a) Routing  
b) Addressing  
c) Forwarding  
d) error and diagnostic functions
- 7) \_\_\_\_\_ is the range of the class C addresses  
a) 1-126  
b) 129-193  
c) 203-239  
d) 192-223
- 8) \_\_\_\_\_ allows you to connect and login to a remote computer  
a) FTP  
b) Telnet  
c) HTTP  
d) SMTP
- 9) To access e-mail from any machine and anywhere, uses \_\_\_\_\_.  
a) PEM  
b) PGP  
c) IMAP  
d) None of these
- 10) \_\_\_\_\_ is a language for creating a static document.  
a) XSL  
b) XML  
c) HTML  
d) All of these

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

- 1) Bluetooth is an example of Personal area network.
- 2) The term FTP stands for File transmission protocol.
- 3) In OSI model, Session layer provides dialog control and token management.
- 4) MAN covers large geographical area, often a country or continent.
- 5) The ability of a single network to span multiple physical networks is known as Subnetting.
- 6) The computation of the shortest path in OSPF is usually done by Dijkstra's algorithm

**Q.2 Write Short Note on:****16**

- 1) Jitter
- 2) HTTP
- 3) CRC (Cyclic Redundancy Check)
- 4) WAN

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

- a) Explain the architecture of Internet.
- b) Explain IP Protocol with header structure.

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

- a) Explain TCP/IP Reference Model in detail.
- b) Explain Network Address Translation (NAT).

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

- a) What is SMTP? Explain in detail.
- b) What is UDP? Explain in detail.

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

- a) Explain Berkeley Sockets in detail.
- b) Explain Domain Name System (DNS) in detail.

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

- a) What is Computer Network? Explain different uses of Computer Network.
- b) Explain Shortest Path Routing algorithm.



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**Set P**

**M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov - 2022  
(COMPUTER SCIENCE)  
Artificial Intelligence**

Day &amp; Date: Wednesday, 22-02-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

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

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

- 1) In an artificial Neural Network, interconnected processing elements are called \_\_\_\_\_.  
a) nodes or neurons      b) weights  
c) axons      d) soma
- 2) Conversion of a fuzzy set to a single crisp value is called \_\_\_\_\_.  
a) fuzzification      b) defuzzification  
c) fuzzy logic      d) fuzzy rule
- 3) Graph used to represent semantic network is \_\_\_\_\_.  
a) Undirected graph  
b) Directed graph  
c) Directed Acyclic Graph (DAG)  
d) Directed complete graph
- 4) 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
- 5) Neuron can send \_\_\_\_\_ signal at a time.  
a) multiple      b) one  
c) none      d) any number of
- 6) Reproduction operator is also known as \_\_\_\_\_.  
a) Recombination      b) Selection  
c) Regeneration      d) none of the above
- 7) The performance of an agent can be improved by \_\_\_\_\_.  
a) Learning      b) Observing  
c) Perceiving      d) None of the above

- 8) \_\_\_\_\_ fuzzy input vectors to crisp outputs.  
a) neuro - fuzzy                      b) Fuzzy - backpropagation  
c) neuro - genetic                    d) fuzzy - genetic
- 9) 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
- 10) In an artificial Neural Network. interconnected processing elements are called \_\_\_\_\_.  
a) nodes or neurons                  b) weights  
c) Axons                                d) soma

**Q.1 B) Fill in the blanks / True or False** **06**

- 1) An inference algorithm that derives only entailed sentences is called sound or truth-preserving. (True / False)
- 2) The basic inference mechanism in the semantic network is to follow the links between the nodes. (True / False)
- 3) The number of elements in a set is called its \_\_\_\_\_.
- 4) The structural constitute of a human brain is known as \_\_\_\_\_.
- 5) There are primarily two modes for an inference engine: forward chaining and backward chaining. (True / False)
- 6) The space for all possible feasible solutions is called \_\_\_\_\_.

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

- a) Discuss the Characteristics of a production system.
- b) Explain Breadth-First Search.
- c) Explain the issues in knowledge representation.
- d) Explain the steps in natural language processing.

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

- a) Explain the rule-based system with an example.
- b) What is conceptual dependency and list its categories?

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

- a) What is matching? Explain matching with an example.
- b) State and explain the water jug problem with a suitable example.

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

- a) Explain the Characteristics of a production system.
- b) Discuss procedural versus declarative knowledge with suitable examples.

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

- a) Define Artificial Intelligence. Discuss various task domains in Artificial Intelligence.
- b) Why there is a need for alpha-beta pruning? Explain with the example.

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

- a) Explain heuristic search techniques.
- b) Explain ISA relation with a suitable example.

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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022****COMPUTER SCIENCE  
Digital Image Processing**

Day &amp; Date: Monday, 13-02-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

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

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

- 1) The \_\_\_\_\_ are used to represent a boundary by a connected sequence of straight-line segments of specified length and direction.
  - a) Polygonal Approximations
  - b) Polygonal codes
  - c) Chain Codes
  - d) Simple codes
- 2) The \_\_\_\_\_ is the most common approach for detecting meaningful discontinuities in the gray level.
  - a) Line Detection
  - b) Edge Detection
  - c) Point Detection
  - d) Circle Detection
- 3) The \_\_\_\_\_ property of FT of a 2D image can be computed by two passes of the 1D FT algorithm, one along the rows and the other along the columns.
  - a) Periodicity
  - b) Translation
  - c) Transformation
  - d) Separability
- 4) \_\_\_\_\_ is the main application of Histogram Equalization.
  - a) Blurring
  - b) Image enhancement
  - c) Contrast adjustment
  - d) Image Segmentation
- 5) \_\_\_\_\_ is the dominant application of microwave in image processing.
  - a) radar
  - b) medicines
  - c) Lens enhancement
  - d) Medical diagnoses
- 6) The \_\_\_\_\_ filter passes low frequencies.
  - a) High pass
  - b) Low pass
  - c) Band pass
  - d) None of these
- 7) In \_\_\_\_\_ step of the image processing assigns a label to an object based on its descriptors.
  - a) Object recognition
  - b) Representation & description
  - c) Morphological processing
  - d) Segmentation
- 8) The \_\_\_\_\_ filter is worked on the basis in Image formation model.
  - a) Homomorphic
  - b) Gaussian Highpass
  - c) Ideal Low Pass
  - d) Butterworth Highpass

- 9) The \_\_\_\_\_ technique is used to generate a processed image that have a specified histogram.
- Histogram equalization
  - Histogram processing
  - Histogram linearization
  - Histogram matching
- 10) If  $f(x, y)$  is an image function of two variables, then the first order derivative of a one dimensional function,  $f(x)$  is
- $f(x) - f(x + 1)$
  - $f(x + 1) - f(x)$
  - $f(x) + f(x - 1)$
  - $f(x - 1) - f(x + 1)$

**Q.1 B) Fill in the blanks.****06**

- Images with salt noise can be filtered using \_\_\_\_\_ values of contra-harmonic mean filter.
- The histogram of \_\_\_\_\_ image is concentrated low side of the grey scale.
- Filter that replaces the pixel value with the medians of intensity levels is known as \_\_\_\_\_.
- The ringing effect are available in \_\_\_\_\_ low pass filter.
- The \_\_\_\_\_ technique of gray-level transformation increases the dynamic range of gray-level.
- In \_\_\_\_\_ domain of image processing works directly on pixels.

**Q.2 Solve any Eight of the following.****16**

- What is blending? Explain in detail.
- What is rolling ball analogy? Explain in detail.
- Explain Relational Descriptors in detail.
- Explain Linear and Nonlinear Operations in detail.

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

- What are fundamental steps in Digital Image Processing? Explain in detail.
- Explain region filling technique with example.

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

- Explain different intensity transformations used in image processing in detail.
- Explain Recognition based on decision- theoretic methods in detail.

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

- Find out mean vector and covariance for following vector  
 $x_1=(0,1,1)^T$ ,  $x_2=(1,1,0)^T$ ,  $x_3=(0,1,0)^T$ ,  $x_4=(1,1,1)^T$
- What are different masks used for line detections? Explain in detail.

**Q.6 Answer the followings.****16**

- Explain the terms dilation and erosion, opening and closing, hit miss transformation in detail.
- Explain Piecewise-Linear Transformation in detail.

**Q.7 Answer the followings.****16**

- Explain Sharpening Frequency Domain Filters in detail.
- What is Sampling and Quantization? Explain in detail.

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Set **P**

**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)**

**Open Source Technologies (PHP, MySql)**

Day &amp; Date: Tuesday, 14-02-2023

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.3 to Q.7  
3) Figures to the right indicate full marks.

**Q.1 A) Choose Correct Alternative. 10**

- 1) Which one of the following method is responsible for sending the query to the database?
 

a) query()	b) send_query()
c) sendquery()	d) query_send()
- 2) \_\_\_\_\_ method can be used to diagnose and display information about a MySQL connection error?
 

a) connect_errno()	b) connect_error()
c) mysqli_connect_errno()	d) mysqli_connect_error()
- 3) Which of the following is correct way of creating an array?
 

a) \$state[0] = "Solapur";	b) \$state = array("Solapur");
c) Both A and B	d) None of these
- 4) Which one of the following function is used to start a session?
 

a) start_session()	b) session_start()
c) session_begin()	d) begin_session()
- 5) Which two predefined variables are used to retrieve information from forms?
 

a) \$GET & \$POST	b) \$_GET & \$_POST
c) GET\$ & POST\$	d) GET & POST
- 6) Which of the following function returns the number of characters in a string variable?
 

a) count(\$variable)	b) len(\$variable)
c) strcount(\$variable)	d) strlen(\$variable)
- 7) Which of the following function is capable of reading a specific number of characters from a file?
 

a) fgets()	b) fget()
c) fileget()	d) filegets()
- 8) The filesize () function returns the file size in \_\_\_\_\_.
 

a) Bits	b) Bytes
c) Kilobytes	d) Gigabytes
- 9) Which of the following keyword is used to prevent a method from being overridden by a subclass?
 

a) Final	b) Protected
c) Sealed	d) Abstract

- 10) \_\_\_\_\_ function is used to return a part of string.
- a) str()
  - b) substring
  - c) substr()
  - d) strsub()

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

- 1) \_\_\_\_\_ is the most popular Open Source SQL database management system software.
- 2) \_\_\_\_\_ function checks whether a variable is an array or not.
- 3) Information sent from an HTML form with the \_\_\_\_\_ method is visible to everyone.
- 4) PHP is an example of \_\_\_\_\_ scripting language.
- 5) A cookie is created with the \_\_\_\_\_ function.
- 6) PHP recognizes constructors by the name \_\_\_\_\_.

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

- a) Characteristics of PHP
- b) parent:: and self:: keyword
- c) Differences between GET and POST methods
- d) Associative Array

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

- a) What is Cookies? Explain with suitable example.
- b) What is abstract class? Explain it with suitable example.

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

- a) What is \$\_POST? Explain with example.
- b) Write a PHP script which takes the username, password and e-mail values from user and checks whether the user has filled the textboxes or not. Also, check the e-mail field whether it is incorrect format or not.

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

- a) Write a program to create a session, to set a value in session, and to remove data from a session.
- b) Write the PHP code for fetching the data from a database to a webpage.

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

- a) With a suitable example explain the different methods of reading and writing into a file.
- b) Explain Joomla framewok. Explain different steps to develop website.

**Q.7 Write a note on.****16**

- a) Exceptions in PHP
- b) Function overloading and overriding in PHP

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10) An electronic document that establishes your credentials when you are performing transactions.

- a) Digital code
- b) OTP
- c) E-mail
- d) Digital certificate

**B) Fill in the blanks:**

**06**

- 1) The processed S/MIME along with security related data is called as \_\_\_\_\_.
- 2) The combination of key exchange, hash, and encryption algorithms defines a \_\_\_\_\_ for each SSL session.
- 3) IPSec is designed to provide security at the \_\_\_\_\_.
- 4) \_\_\_\_\_ provides privacy, integrity, and authentication in e-mail
- 5) \_\_\_\_\_ is the first step in DES.
- 6) SSL primarily focuses on \_\_\_\_\_.

**Q.2 Answer the following.**

**16**

- 1) What is mean by threat and attack? Explain types of Attack.
- 2) What is mean by Cryptography? Explain Secret Key and Public Key Cryptosystems.
- 3) Define Network Security. Explain Network and Transport Layer Security.
- 4) What is mean by Proxy Severs? Explain Firewall setting in Proxy Servers.

**16**

**Q.3** a) Explain Network Security Architectures in details.

b) Briefly explain the design principles of block cipher.

**Q.4 Answer the following**

**16**

- a) Briefly explain Data Encryption Standard (DES) in Cryptography.
- b) Define the Firewall? Explain different types of firewall in details.

**Q.5 Answer the following**

**16**

- a) What do mean by Authentication Mechanisms? List out different Authentication Mechanisms? Explain Smart cards and Biometrics.
- b) Briefly explain Model for Internet work Security in network security.

**Q.6 Answer the following**

**16**

- a) Briefly explain SSL Encryption and TLS in web security.
- b) Briefly explain Non- Interference and Role Base Model in Access Control Mechanisms.

**Q.7 Answer the following**

**16**

- a) Briefly explain Internet Standards and RFCs in network security.
- b) Briefly explain E-mail security and PGP's / MIME in web Security.



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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022**  
**(COMPUTER SCIENCE)**  
**Cloud Computing**

Day & Date: Wednesday, 15-02-2023  
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

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

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

**10**

- 1) 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) \_\_\_\_\_ clouds are shared by several organizations and support a specific group that has shared concerns.
  - a) Managed
  - b) Virtual
  - c) Community
  - d) Hybrids
- 4) \_\_\_\_\_ implementation involves a complex transition from legacy information systems and business processes to an integrated IT infrastructure and common business process throughout the organization.
  - a) ERP
  - b) FRP
  - c) DRP
  - d) MRP
- 5) Typical \_\_\_\_\_ -type ERP components are sales and distributions (SD), banking and financials, customer relationship management (CRM) and supply chain management (SCM)
  - a) TLAP
  - b) OLAP
  - c) JLAP
  - d) CLAP
- 6) Enterprises were experimenting with \_\_\_\_\_ in various contexts for examples R&D-type projects for testing new services and applications and low-priority business applications.
  - a) EaaS
  - b) IaaS
  - c) MaaS
  - d) PaaS
- 7) \_\_\_\_\_ lays at the foundation of many public clouds, it provides a grid operating system that includes workload distribution, metering, and management of applications.
  - a) LockLogic
  - b) TeraLogic
  - c) AppLogic
  - d) SizeLogic

- 8) \_\_\_\_\_ customers are billed on a pay-per-use basis and by taking into account the different services: compute, storage, bandwidth, and storage transactions.
- |           |          |
|-----------|----------|
| a) Azare  | b) Azuer |
| c) Azuret | d) Azure |
- 9) Secure Socket Layer (SSL) is widely used and \_\_\_\_\_.
- |              |               |
|--------------|---------------|
| a) Untrusted | b) Trusted    |
| c) Costly    | d) Reasonable |
- 10) \_\_\_\_\_ is the illusion of infinite computing resources.
- |                    |                      |
|--------------------|----------------------|
| a) Cloud Computing | b) Google Computing  |
| c) Yahoo Computing | d) Netflix Computing |

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

- 1) Clouds are hardware based services offering compute, network, and storage capacity.
- 2) Cloud computing is an emerging research infrastructure that builds on the achievements of different research areas, such as SOA, grid computing, and virtualization technology.
- 3) The security of data storage is one of the necessary tasks to be addressed before the blueprint for cloud computing is accepted.
- 4) Google AppEngine provides a set of APIs and an application model that allow developers to take advantage of additional services provided by Google such as Mail, Datastore, Memcache, and others.
- 5) An example of a non hosted integration technology is Informatica PowerCenter Cloud Edition on Amazon EC2.
- 6) Constraining attributes of SaaS applications is that the massive amounts of information that do not need to move between SaaS and on-premise systems daily and the need not to maintain data quality and integrity.

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

- a) Explain in brief Community Clouds.
- b) What do you mean by Virtual Machine (VM)?
- c) What is SaaS?
- d) What is Internet?

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

- a) Explain in detail Application Level Security as Infrastructure Security.
- b) What are various issues in Cloud Computing?

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

- a) What is Cloud? Discuss in detail various types Cloud Service Models with suitable example.
- b) What do you mean by Amazon EC2-Renting and EC2 Compute Units?

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

- a) Explain in detail major roles and advantages of Service Oriented Architecture.
- b) What do you mean by Cloud Deployment Model? State and explain various models of it.

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

- a) What is PaaS? State and explain features and advantages of Google App Engine.
- b) What do you mean by Virtualization? State and explain different approaches to virtualization.

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

- a) What do you mean by Cloud Computing? Explain its architecture and various characteristics.
- b) Discuss in detail Software as a Service (SaaS) with suitable example.

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**Set P**

**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Mobile Computing**

Day & Date: Wednesday, 15-02-2023  
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

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

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

- 1) What is Mobile communication?
  - a) Allows to communicate from same locations with the use of physical medium
  - b) Allows to communicate from different locations with the use of physical medium
  - c) Allows to communicate from same locations without the use of physical medium
  - d) Allows to communicate from different locations without the use of physical medium
- 2) \_\_\_\_\_ stores the data related to the user and is relevant to GSM mobile systems as well.
  - a) SIM (Subscriber Identity Module)
  - b) CMR (Customer- Managed Relationship)
  - c) VLR (Visitor Location Register)
  - d) HMR (Header Manipulation Rule)
- 3) Which type of multiplexing enables to use of the whole bandwidth simultaneously?
  - a) FDMA
  - b) CMDA
  - c) TDMA
  - d) None of the above
- 4) Which of the following techniques utilizes a similar frequency in the cellular network?
  - a) Frequency planning
  - b) Frequency hopping
  - c) Frequency reuse
  - d) All of these
- 5) Which of the following technology uses wireless communication mode to exchange data or transfer data between several mobiles in the short-range?
  - a) Mobile Computing
  - b) Ad hoc computing
  - c) Bluetooth technology
  - d) None
- 6) Which of the following can be considered as the primary function of snooping TCP?
  - a) To buffer data close to the mobile host to perform fast local retransmission in case of packet loss
  - b) Congestion control
  - c) Flow control
  - d) None of the above

- 7) The \_\_\_\_\_ protocol solves the problem of hidden and exposed terminal.
  - a) PRMA
  - b) DAMA
  - c) TDMA
  - d) MACA
- 8) ISDN stands for \_\_\_\_\_.
  - a) Internet Switched Digital Network
  - b) Integrated Switching Dial Network
  - c) Integrated Switched Digital Network
  - d) Indian Switched Digital Network
- 9) Bluetooth is a \_\_\_\_\_ technology that connects devices in a small area.
  - a) Wired LAN
  - b) Wireless LAN
  - c) VLAN
  - d) None of the above
- 10) Waves in the \_\_\_\_\_ range are used by submarines, because they can penetrate water and can follow the earth surface.
  - a) Low Frequency
  - b) High Frequency
  - c) Very High Frequency
  - d) Ultra High Frequency

**B) State True or False.**

06

- 1) The MSC means Mobile Service and Switching Center.
- 2) The cell shape created by wireless transmission is hexagon in GSM.
- 3) A small division of a given geographical area is known as guard band.
- 4) In 1978 year was the communication in 2G launched in the market.
- 5) The full duplex channel is used for bidirectional communication simultaneously.
- 6) CODA file system offers the same features that the Andrew File System provides

**Q.2 Answer the following.**

16

- a) Mobility management
- b) General packet radio service
- c) Advance techniques in mobile computing
- d) WML

**Q.3 Answer the following.**

16

- Draw and explain the GSM Architecture in detail.
- Write the quality of service in 3G.

**Q.4 Answer the following.**

16

- Explain the Bluetooth technology and protocols.
- Explain the case study for GLOBALSTAR system.

**Q.5 Answer the following.**

16

- Draw and explain the Mobile TCP working in detail with advantages.
- Explain the network signaling.

**Q.6 Answer the following.**

16

- Draw and explain the WLL architecture in detail.
- Explain the global satellite systems.

**Q.7 Answer the following.**

16

- Explain in detail Mobile Terminated Call (MTC).
- What is multiplexing? Explain the TDMA and CDMA techniques.

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**M.SC. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
.Net Technology**

Day & Date: Monday, 20-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

**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 alternatives. (MCQ) 10**

- 1) What is false about the constructor?
  - a) Class name and Constructor name are same.
  - b) Constructor are return type.
  - c) Constructor are public.
  - d) Constructor are overloaded.
- 2) The \_\_\_\_\_ state technique maintain data across users.
  - a) Application
  - b) Session
  - c) Cookies
  - d) Query String
- 3) \_\_\_\_\_ is value type data type.
  - a) Class
  - b) String
  - c) Struct
  - d) Delegate
- 4) The \_\_\_\_\_ method of command object supports forward-only, read-only access to retrieve rows from the data source.
  - a) ExecuteReader()
  - b) ExecuteNonQuery().
  - c) ExecuteScalar().
  - d) ExecuteReadOnly().
- 5) Suppose we want to validate entered value is divisible by 5 or not then \_\_\_\_ validation control is used.
  - a) RangeValidator
  - b) CustomValidator
  - c) RegularExpressionValidator
  - d) BaseValidator
- 6) The \_\_\_\_\_ property of calendar control is used to select entire week.
  - a) SelectedDate
  - b) SelectedDates
  - c) SelectedWeek
  - d) SelectionMode
- 7) \_\_\_\_\_ property of Textbox control does not allow updating of data.
  - a) Update
  - b) Modify
  - c) ReadOnly
  - d) Disable
- 8) \_\_\_\_\_ is a type of class that does not have its own objects but acts as a base class for its subclass.
  - a) Static class
  - b) Abstract class
  - c) Sealed class
  - d) None of these
- 9) The \_\_\_\_\_ directive's duration attribute determines how long the page is cached.
  - a) @Cache
  - b) @OutputCache
  - c) @OutCache
  - d) @PageCach

- 10) To create a database connection, \_\_\_\_\_ property must be specified.
- a) bConnection
  - b) dbSource
  - c) dataSource
  - d) connectionString

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

- 1) CTS stands for \_\_\_\_\_.
- 2) \_\_\_\_\_ namespace is required for DataTable.
- 3) \_\_\_\_\_ property of multiview control is used for active view.
- 4) \_\_\_\_\_ element need to specify for filtering advertises in AdRotator control.
- 5) To limit the scope of cookies to a specific folder, \_\_\_\_\_ property is used.
- 6) Defining two methods with the same name but with different parameters is called as method \_\_\_\_\_.

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

- a) What is boxing and unboxing? Explain with example.
- b) What is enum? Explain enum with example.
- c) Explain global.asax file in detail.
- d) Explain wizard control with example.

**Q.3 Answer the following.**

- a) What is Indexer? Explain indexer with example.
- b) Explain RegularExpressionValidation control and CustomValidation control with example.

**10****06****Q.4 Answer the following.**

- a) What is interface? Explain interface with example.
- b) What is dynamic compilation? Explain in detail.

**08****08****Q.5 Answer the following.**

- a) What are nested master pages? Explain event ordering in master pages.
- b) Design windows application for select, insert and delete records.

**08****08****Q.6 Answer the following.**

- a) What is delegates? Explain anonymous delegate with example.
- b) What is state management? Explain client side state management techniques in details.

**08****08****Q.7 Answer the following.**

- a) What is use of \App\_GlobalResource and \App\_LocalResource folder? Explain with example.
- b) What is Abstract class? Explain with example.

**10****06**

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**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Machine Learning**

Day & Date: Tuesday, 21-02-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

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

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

- 1) An \_\_\_\_\_ is a sequence of instructions that should be carried out to transform the input to output.  
a) Transformer                      b) Tester  
c) Algorithm                        d) Agglomerative
- 2) In medicine, learning programs are used for medical \_\_\_\_\_.  
a) Dilation                          b) Diagnosis  
c) Drug Delivery                  d) Lincensy
- 3) The machine learning program should be able to assess the goodness of policies and learn from past good action sequences to be able to generate a policy. Such learning methods are called \_\_\_\_\_ learning algorithms.  
a) Strategic                        b) Reinforcement  
c) Evaluative                      d) Supervised
- 4) If the system can \_\_\_\_\_ and adapt to environmental changes, the system designer need not foresee and provide solutions for all possible situations.  
a) Learn                            b) Module  
c) Analyse                        d) Design
- 5) \_\_\_\_\_ learning is programming computers to optimize a performance criterion using example data or past experience.  
a) Performance                  b) Database  
c) Information                    d) Machine
- 6) There are many applications of machine learning in \_\_\_\_\_.  
a) Project                          b) Data  
c) Machine                        d) Pattern



- 7) Having a rule in consideration, the main application is \_\_\_\_\_ : Once we have a rule that fits the past data, if the future is similar to the past, then we can make correct \_\_\_\_\_ for novel instances.
- a) Propagation                      b) Peripheral  
c) Prediction                      d) Persistence
- 8) \_\_\_\_\_ learning, the aim is to learn a mapping from the input to an output whose correct values are provided by a supervisor.
- a) Unsupervised                      b) Warehouse  
c) Supervised                      d) Semantic
- 9) A \_\_\_\_\_ program groups pixels with similar colors in the same group, and such groups correspond to the colors occurring frequently in the image.
- a) Classification                      b) Clustering  
c) Robust                      d) Identical
- 10) \_\_\_\_\_ is called discriminant analysis in pattern recognition statistics.
- a) Density analysis                      b) Continuous feature  
c) Classification                      d) Standardization

**Q.1 B) State True or False.****06**

- 1) Machine learning is also related to artificial intelligence.
- 2) Scientists design experiments and make observations and collect data.
- 3) In some applications, the output of the system is a sequence of actions.
- 4) An interesting application of clustering is in image compression.
- 5) A robot navigating in an environment in search of a goal location is another application area of Unsupervised learning.
- 6) Aim of machine learning is to understand the processes underlying learning in humans and animals, but not to build useful systems, as in any domain of engineering.

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

- a) Write a short note on Artificial Intelligence.
- b) What do you mean by Machine Learning?
- c) Explain in brief Over fitting?
- d) What do you mean by Data cleaning?

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

- Define Dimension Reduction? Explain in detail various steps of PCA algorithm?
- State and explain Naive Bayes Classification for the given frequency table and generate likelihood table for  $(P(x/c) = P(\text{Hot} | \text{Yes}) = ?)$  and  $(P(x/c) = P(\text{Hot} | \text{No}) = ?)$ .

Frequency Table		Play Cricket	
		Yes	No
Temperature	Hot	2	2
	Mild	4	2
	Cold	3	1

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

- State and Explain Machine Learning vs Artificial Intelligence vs Deep Learning?
- What do you mean by Unsupervised Learning? Discuss steps of K-Means Algorithm with suitable example?

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

- What is KNN? Discuss working of KNN to classify a person having weight '57kg' and Height '172cm' as Normal or Underweight?

Weight	Height	Class
56	174	Underweight
58	169	Normal
55	170	Normal
57	173	Normal
51	167	Underweight

- What do you mean by Reinforcement Learning? State and explain various applications of Machine Learning?

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

- What do you mean by Regression? Explain in detail Logistic regression with example.
- What are Machine Learning types? Explain in detail general process of Machine Learning.

**Q.7 Answer the following.**

- a) Define Supervised Learning? Explain its various application with suitable example?
- b) Explain Apriori Association rule to predict the support value for the given transancation with minimum support value of '2'?

Pass 1: {A}, {B}, {C}, {D}, {E}

Pass 2: {A,B}, {A,C}, {A,D}, {A,E}, {B,C}, {B,D}, {B,E}, {C,D}, {C,E}

Pass 3: {A,B,C}, {A,B,D}, {A,B,E}, {B,C,D}, {B,C,E}, {C,D,E}

Transaction	Itemset
T1	{B, C, D, E}
T2	{B, C, D}
T3	{A, B, D}
T4	{A, B, C, D, E}
T5	{A, B, C}
T6	{B, E}

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**Set P**

**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Data Warehouse & Mining**

Day &amp; Date: Wednesday, 22-02-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

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

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

- 1) An \_\_\_\_\_ collects all of the information about subjects spanning the entire organization.  
a) Enterprise warehouse      b) Data Mart  
c) Virtual warehouse      d) Refresh
- 2) \_\_\_\_\_ which converts data from legacy or host format to warehouse format.  
a) Refresh Data      b) Data Transformation  
c) Data Cleaning      d) Data Extraction
- 3) \_\_\_\_\_ is a visualization operation that rotates the data axes in view to provide an alternative data presentation.  
a) Slice      b) Drill-down  
c) Pivot (rotate)      d) Dice
- 4) Association rules that satisfy both the minimum confidence and support threshold are referred to as \_\_\_\_\_.  
a) Strong Association rules  
b) Weak Association rule  
c) General Association Rule  
d) None of these
- 5) \_\_\_\_\_ schema can be viewed as a collection of stars.  
a) Star      b) Snowflake  
c) Fact constellation      d) Hybrid
- 6) An \_\_\_\_\_ system is market-oriented and is used for data analysis by knowledge workers.  
a) OLPP      b) OLTP  
c) OLEP      d) OLAP

- 7) The same minimum support threshold is used when mining at each abstraction level is referred as: \_\_\_\_\_.  
a) Reduced Support                      b) Same support  
c) Uniform support                      d) Minimum support
- 8) The class label of each training tuple is not known, and the number or set of classes to be learned may not be known in advance is known as: \_\_\_\_\_.  
a) Unsupervised learning              b) Self learning  
c) Supervised learning                  d) None of these
- 9) \_\_\_\_\_ is the process of partitioning a set of data objects (or observations) into subsets.  
a) Classification                          b) Prediction  
c) Clustering                              d) None of these
- 10) A divisive hierarchical clustering method employs a \_\_\_\_\_ strategy.  
a) Top-down                                b) Bottom-up  
c) Random                                  d) None of these

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

- 1) An OLAP system is customer-oriented and is used for transaction and query processing by clerks, clients, and information technology professionals.
- 2) A data cube allows data to be modelled and viewed in single dimension.
- 3) The roll-up operation performs aggregation on a data cube, either by climbing up a concept hierarchy for a dimension or by dimension reduction.
- 4) An enterprise warehouse collects all of the information about subjects spanning the entire organization.
- 5) Binary variables are continuous measurements of a roughly linear scale.
- 6) DBSCAN grows clusters according to a density-based connectivity analysis.

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

- a) What is Data Cleaning? Explain with suitable example.
- b) What is data mining? Explain 'Task Relevant Data' as a primitive.
- c) Explain Unsupervised learning with example.
- d) Explain Divisive hierarchical clustering method with example.

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

- a) What is cluster analysis? Explain various typical requirements of clustering in data mining.
- b) Explain decision tree induction method with example.

- Q.4 Answer the following.** **16**
- a) What is Data warehouse? Explain the difference between OLTP and OLAP.
  - b) Describe Data warehouse architecture with well labelled diagram.
- Q.5 Answer the following.** **16**
- a) Explain k-medoid algorithm with suitable example.
  - b) Explain Back Propagation method with suitable example.
- Q.6 Answer the following.** **16**
- a) What is data cube? Explain different schemas for multidimensional model.
  - b) What is association rule? Explain various applications of association rules.
- Q.7 Answer the following.** **16**
- a) Explain the procedure of Apriori algorithm with example.
  - b) Explain different Applications of Data Mining.

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Set **P**

**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov - 2022**  
**(COMPUTER SCIENCE)**  
**Soft Computing**

Day & Date: Thursday, 23-02-2023  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

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

- 1) Algebraic sum of (0.6, 0.4) = \_\_\_\_\_.  
 a) 0.4                                      b) 0.6  
 c) 0.76                                      d) 1
- 2) Let  $A = \{a, b, c\}$  The power set of A is \_\_\_\_\_.  
 a)  $\{\{a\}, \{b\}, \{c\}\}$   
 b)  $\{\phi, \{a\}, \{b\}, \{c\}\}$   
 c)  $\{\{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}\}$   
 d)  $\{\phi, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}\}$
- 3) The input for any neuron from the other connected neurons are received through \_\_\_\_\_.  
 a) dendrites                                      b) synapse  
 c) axon    d) soma
- 4) Mutation means element of \_\_\_\_\_ modified.  
 a) Chromosome                                      b) Genome  
 c) DNA    d) Genotype
- 5) \_\_\_\_\_ is the degree to which the better individual is selected.  
 a) Selective pressure                                      b) Selection rank  
 c) Popularity diversity                                      d) Offspring
- 6) A fuzzy set is said to be interval valued if \_\_\_\_\_ have lower and upper bounds.  
 a) the fuzzy set  
 b) the input values of that fuzzy set  
 c) their fuzzy membership grades  
 d) all the above
- 7) Thresholding is one of the \_\_\_\_\_ used to generate output of a neural network.  
 a) Quash function                                      b) Active function  
 c) Transfer function                                      d) Both (b) and (c)
- 8) A binary relation  $(X,)$  is a compatibility relation if it is \_\_\_\_\_.  
 (i) Reflexive      (ii) Transitive                                      (iii) Symmetric  
 a) (i) and (ii)                                      b) (i) and (iii)  
 c) (ii) and (iii)                                      d) (i), (ii) and (iii)

- 9) The nonlinear function used to generate output of a neuron is \_\_\_\_\_.  
 a) Splash function                      b) Transfer function  
 c) Activation function                  d) (a) and (b)
- 10) Which of the following is not a traditional search and optimization methods?  
 a) Cellular automata                      b) Genetic algorithms  
 c) Random cost                              d) Queuing

**Q.1 B) Fill in the blanks.****06**

- 1) Other than input and output layers, the number of layer(s) present in a single layer feedback neural network is/are \_\_\_\_\_.  
 2) A 4-input neuron has weights 1, 2, 3, and 4. The transfer function is linear, with the constant of proportionality being equal to 2. The inputs are 4, 10, 5, and 20, respectively. The output will be: \_\_\_\_\_.  
 3) The chromosome is sequence of \_\_\_\_\_.  
 4) A fuzzy relation  $R(x, y) \neq R(y, x)$  for some  $x, y \in X$ , then the relation is called as \_\_\_\_\_ relation.  
 5) Conversion of Fuzzy output set to crisp output by using \_\_\_\_\_.  
 6) Element in fuzzy set has membership degree between \_\_\_\_\_.

**Q.2 Answer the followings.****16**

- a) Properties of Fuzzy set  
 b) Biological Neuron Verses Artificial Neuron  
 c) Strength of GA  
 d) Supervised and Unsupervised learning

**Q.3 Answer the followings.****16**

- a) What is feed forward neuron network? For the given matrix  
 $IP = [0.9, -0.2, 0.4]$  and  $Weight = [0.7, 0.8, -0.3]$ , calculate the output of neuron for sigmoidal function.  
 b) Write the different applications of neural network.

**Q.4 Answer the followings.****16**

- a) Let  $A = \{0.1, 0.4, 0.6, 0.7, 0.8, 1.0\}$  and  $B = \{0.1, 0.2, 0.5, 0.7, 0.8, 0.9\}$  be the fuzzy sets. Calculate the  $(A \cap B)$ ,  $(A \cup B)$ ,  $(A - B)$  and  $(B - A)$ . Also calculate the alpha and strong alpha cut for above where  $\alpha = \{0.1, 0.4, 0.6, 0.9, 1.0\}$   
 b) Calculate the Max-Min composition for following fuzzy relation.  
 $R = \{0.5/10 + 0.7/20 + 0.2/30 + 0.9/40\}$ ,  
 $S = \{0.4/10 + 0.1/20 + 0.8/30 + 0.6/40\}$

**Q.5 Answer the followings.****16**

- a) Draw the structure of Artificial Neuron and explain the different components of it.  
 b) What is Crossover? Explain its types with example.



**Q.6 Answer the followings.****16**

- a) Calculate the Algebraic Sum, Algebraic Product, Bounded Sum and Bounded Difference for following fuzzy sets.  
 $A = \{0.6/0 + 0.9/1 + 0.4/2 + 1.0/3 + 0.7/4\}$   
 $B = \{0.3/0 + 0.2/1 + 1.0/2 + 0.9/3 + 0.8/4\}$
- b) Explain back propagation algorithm with example.

**Q.7 Answer the followings.****16**

- a) Roulette Wheel Selection.
- b) Rank Selection

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**Set P**

**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov - 2022  
(COMPUTER SCIENCE)  
Block Chain Technology**

Day & Date: Thursday, 23-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

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

- 1) Fundamentals of block chain technology \_\_\_\_\_.  
a) Decentralized                      b) Distributed Network Technology  
c) Both of these                      d) None of these
- 2) Cryptography keys consist \_\_\_\_\_.  
a) Private Key                      b) Public Key  
c) Both of these                      d) None of these
- 3) Which of the following industry can use blockchain technology for cyber security?  
a) Logistics                      b) Healthcare  
c) Critical infrastructure                      d) All of these
- 4) \_\_\_\_\_ is a hash function.  
a) A fork  
b) UTXO  
c) Gas  
d) Takes an input of any length and returns a fixed-length
- 5) When a record is on a blockchain, \_\_\_\_\_ can access it.  
a) Multiple people simultaneously  
b) One person at a time  
c) Only the people involved in the transaction  
d) Bank
- 6) P2P Stand for \_\_\_\_\_.  
a) Password to Protect  
b) Protection to Product  
c) Peer to Peer  
d) Private Key to Public Key
- 7) Smart contracts means \_\_\_\_\_.  
a) Define the rules and penalties around a specific agreement  
b) Define the procedure of using wallet  
c) Define the standard operational procedures  
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) \_\_\_\_\_ is a distributed ledger that is not publicly accessible.  
a) Permissioned Blockchain  
b) Permission Less  
c) Both of these  
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

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

- 1) Once records are submitted on a blockchain, they can be altered.
- 2) An orphan block is only created when 51% attack is successful.
- 3) Verifiable random function (VRF) is a public-key pseudorandom function that provides proofs that its outputs were calculated correctly.
- 4) Zero-Knowledge Systems is also known as Freedom Network.
- 5) In Bitcoin in order to communicate, the opcodes (OP CODES) not used.
- 6) Hyperledger Fabric is not an open source framework.

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

- a) Immutable Ledger
- b) Hash Pointer
- c) Digital Cash
- d) Sharding

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

- a) What is Blockchain Technology? Explain advantages and disadvantages.
- b) What is How Byzantine Generals Problem? Bitcoin solves the Byzantine Generals Problem?

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

- a) State difference between Proof of Work (PoW) and Proof of Stake (PoS).
- b) What are privacy issues in blockchain? Explain in detail.

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

- a) What is Verifiable Random Functions (VRF)? Explain in detail.
- b) What is difference between Blockchain 2 and Blockchain 3?

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

- a) What is Hyperledger fabric? Explain benefits of Hyperledger fabric?
- b) What is Hash functions? State Features of Hash Functions?

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

- a) Difference between Permissioned Blockchain and Permission less Blockchain?
- b) What is smart contract? How Turing Completeness work in Smart Contract Language?

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**M.Sc. (Semester-IV) (Old) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
.NET Technology**

Day & Date: Monday, 20-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 70

**Instruction:** 1) All questions are compulsory.  
2) Figures to right indicate full marks.

- Q.1 A) Choose the correct alternative: 14**
- 1) Which of the following statements is correct about the .NET Framework?
    - a) .NET Framework uses DCOM for achieving language interoperability
    - b) .NET Framework is built on the DCOM technology
    - c) .NET Framework uses DCOM for making transition between managed and unmanaged code.
    - d) .NET Framework uses DCOM for creating unmanaged applications
  - 2) Which of the following jobs are done by Common Language Runtime?
    - a) It provides core services such as memory management, thread management, and remoting
    - b) It enforces strict type safety
    - c) It provides Garbage Collection Services
    - d) All of the above
  - 3) Which of the following statements are correct about JIT?
    - a) JIT compiler compiles instructions into machine code at run time.
    - b) The instructions compiled by JIT compilers are written in native code.
    - c) All of the above
    - d) None of these
  - 4) Which of the following are the correct statements about delegates?
    - a) Delegates can be used to implement callback notification
    - b) Delegates permit execution of a method on a secondary thread in an asynchronous manner
    - c) Delegate is a user defined type
    - d) All of the mentioned
  - 5) C# does not support \_\_\_\_\_ constructors?
    - a) Parameterized
    - b) Parameter-less
    - c) Class
    - d) Method
  - 6) C# supports a technique known as \_\_\_\_\_, which allows a method to specify explicitly the name of the interface it is implementing.
    - a) Method Implementation
    - b) Implicit Interface Implementation
    - c) Explicit Interface Implementation
    - d) Iterative Interface Implementation
  - 7) Boxing converts a value type on the stack to an \_\_\_\_\_ on the heap.
    - a) Bool type
    - b) Instance type
    - c) Class type
    - d) Object type

- 8) Which of the following is true when referencing master page from content page?
- a) Content pages can reference private indexer in the master page.
  - b) Content pages can reference private Properties in the master page.
  - c) Content pages can reference public Properties in the master page.
  - d) Content pages can reference private Methods in the master page.
- 9) Application\_Start event is available in which file?
- a) Global.asax
  - b) Local.asax
  - c) Web.config
  - d) None of the above
- 10) Which of the following works on server side?
- a) ViewState
  - b) HiddenField
  - c) Application and session
  - d) All of the above
- 11) Which is the first method that is fired during the page load.
- a) PreRender()
  - b) Load()
  - c) Unload()
  - d) Init()
- 12) Which is the DataType return in IsPostBack property?
- a) bit
  - b) boolean
  - c) int
  - d) object
- 13) How do you get information from a form that is submitted using the "post" method?
- a) Request.QueryString
  - b) Request.Form
  - c) Response.write
  - d) Response.writeIn
- 14) Difference between Response.Write() and Response.Output.Write()
- a) Response.Output.Write() allows you to buffer output
  - b) Response.Output.Write() allows you to write formatted output
  - c) Response.Output.Write() allows you to flush output
  - d) Response.Output.Write() allows you to stream output

**Q.2 A) Answer the following (Any Four) 08**

- 1) What is a MSIL code?
- 2) Write scope of the variable in C#.
- 3) What is language interoperability?
- 4) Write use of CLS and CTS.
- 5) How to turn off the Client-Side Validation.

**B) Write Notes on (Any Two) 06**

- 1) What are tracing and debugging in C#?
- 2) What is a reflection in C#? Explain with example.
- 3) Write ASP.Net master page events.

**Q.3 A) Answer the following (Any two) 08**

- a) What are boxing and unboxing in C#?
- b) How does CLR help in program execution? Explain.
- c) What is the role of global.asax in ASP.Net?

**B) Answer the following (Any One) 06**

- 1) What is a master pages in ASP.Net? Explain with example.
- 2) Explain .Net framework with suitable diagram.

- Q.4 A) Answer the following (Any Two) 10**
- 1) What are server side controls in asp.net? Explain.
  - 2) Explain ASP.Net page life cycle with example.
  - 3) Explain ADO.Net classes with suitable examples.
- B) Answer the following (Any One) 04**
- 1) What is a hidden variable in state management?
  - 2) What is the use of HTTP handler in ASP.Net?
- Q.5 Answer the following (Any two) 14**
- a) Explain command line argument in C# with suitable example.
  - b) What is a state management in ASP.Net? Explain with suitable example
  - c) Explain connected and disconnected architecture of ADO.Net.

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**M.Sc. (Semester - IV) (Old) (CBCS) Examination: Oct/Nov-2022  
(COMPUTER SCIENCE)  
Soft Computing**

Day & Date: Tuesday, 21-02-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 70

**Q.1 Multichoice Questions.**

**14**

- 1) The type of activation function expressed below is \_\_\_\_\_.  

$$O = \begin{cases} 1 & \text{if } i \geq 0 \\ -1 & \text{if } i < 0 \end{cases}$$
  - a) Linear
  - b) Unipolar
  - c) Bipolar
  - d) Hard limiter
- 2) A fuzzy relation  $R(X, X)$  is called compatibility relation if it is \_\_\_\_\_.  
  - a) Reflective and symmetric
  - b) Reflective and transitive
  - c) Symmetric and transitive
  - d) Reflective, symmetric and transitive
- 3) The cordiality of a fuzzy set  $A$  is same as the Hamming distance  
  - a)  $d(A, 0)$
  - b)  $d(A, 1)$
  - c)  $d(A, \phi)$
  - d)  $d(A, -1)$
- 4)  $1 \in$  \_\_\_\_\_.  
  - a)  $[1, 5]$
  - b)  $(1, 5)$
  - c) Both
  - d) None
- 5) The way of defining the set as  $A = \{x | P(x)\}$  is known as:  
  - a) Characteristic function
  - b) Representation function
  - c) List method
  - d) Rule method
- 6) Which of the following is not involutive class?  
  - a) Sugeno class
  - b) Yager class
  - c) Both
  - d) None
- 7) Degree of subsethood  $S(A, B)$  is always \_\_\_\_\_.  
  - a)  $S(A, 5) \leq 0$
  - b)  $0 \leq S(A, B) \leq 1$
  - c)  $-1 \leq S(A, B) \leq 1$
  - d)  $S(A, 5) \geq 1$
- 8) Identify odd from the following:  
  - a) Parallel distributed processors
  - b) Neuro computers
  - c) Connection networks
  - d) Neural networks
- 9) The relation '*Taller than*' satisfies the property \_\_\_\_\_.  
  - a) Reflective
  - b) Symmetric
  - c) Transitive
  - d) None
- 10) In genetic algorithm, the degree to which better individuals are selected is known as \_\_\_\_\_.  
  - a) Population diversity
  - b) Selective pressure
  - c) Crossover
  - d) Reproduction



- 11) Which of the following search and optimization methods mimics the principle of natural genetics and natural selection for constituting a search procedure?
  - a) Ant colony optimization
  - b) Simulated annealing
  - c) Evolutionary strategies
  - d) Cellular automata
- 12) In the value encoding system, a chromosome can have \_\_\_\_\_.
  - a) Integers
  - b) Symbols
  - c) Strings
  - d) All
- 13) Back propagation algorithm is an example of \_\_\_\_\_.
  - a) Supervised learning
  - b) Unsupervised learning-based
  - c) Reinforced learning
  - d) Hebbian learning
- 14) A fuzzy set A is known as subnormal if height of A is \_\_\_\_\_.
  - a)  $>1$
  - b)  $<1$
  - c)  $=1$
  - d)  $\geq 1$

**Q.2 A) Answer any four of the following. 08**

- a) Define Bremermann's limit.
- b) Name any four reproduction methods.
- c) Give an example each for supervised and unsupervised learning.
- d) Define equilibrium point.
- e) Define digraph.

**B) Write note on any two 06**

- 1) Briefly explain value encoding system?
- 2) Discuss Gradient descent learning.
- 3) List standard fuzzy operations with an example for each.

**Q.3 A) Answer any two of the following 08**

- 1) Describe alpha cut and strong alpha cut with example for each.
- 2) What is mutation? How it is performed? Explain.
- 3) Illustrate structure of a neuron with a figure.

**B) Answer any one of the following 06**

- 1) Let  $P = \begin{bmatrix} .6 & .2 & 0 \\ .3 & .7 & .2 \\ .5 & .9 & .6 \end{bmatrix}$ ,  $Q = \begin{bmatrix} .2 & 0 & .7 & .1 \\ .2 & .5 & .1 & .5 \\ 0 & .9 & .4 & .9 \end{bmatrix}$  Find Domain, Range and Height of  $P$  and  $Q$ . Also find Standard composition, Sagittal diagram and membership matrix for (a)  $P$  and  $Q$  and (b)  $Q$  and  $P$ .
- 2) Compute the scalar cordiality, degree of subsethood and Hamming distance between fuzzy sets defined by the following functions:  
 $A(x) = \frac{x}{15}$  and  $B(x) = \frac{x^2}{x^3+1}$  for  $x \in |0,1,2, \dots, 10| = X$

**Q.4 A) Answer any two of the following. 10**

- 1) What are the two ways of representing a fuzzy set using crisp set? Illustrate.
- 2) What is crossover? What are its types? Explain with example for each.
- 3) Write back propagation algorithm.

**B) Attempt any one of the following questions.**

- 1) For  $t$ -norm and  $t$ -conorm, find standard intersection, algebraic product, bounded difference and drastic intersection for the following values of  $a, b \in [0,1], a = 0.1$  and  $b = 0.4$
- 2) Given population with their fitness value, compute the percentage of representation using Roulette-wheel selection method:

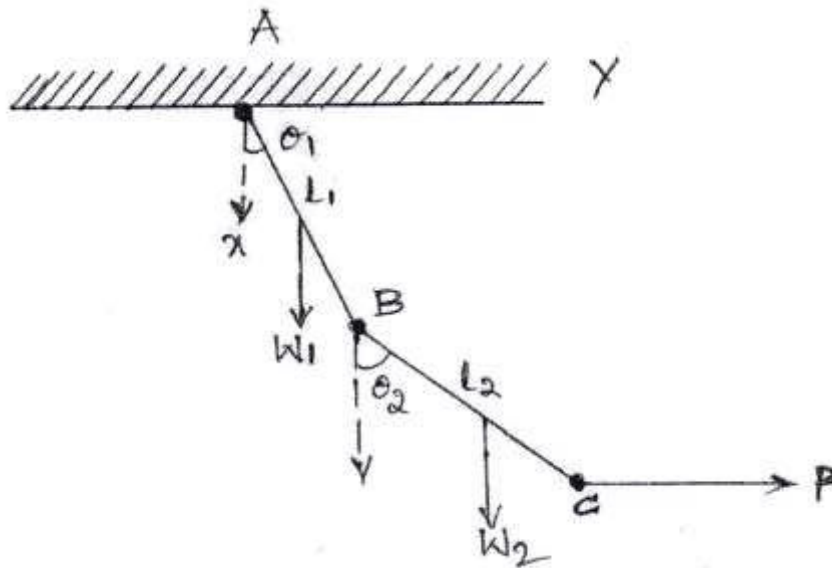
Population No.	Population	Fitness value
1	0000 0000	1
2	0110 0011	1.3
3	0101 0101	2
4	0111 0001	3.2
5	1011 1001	4.3

**Q.5 Answer any two of the following**

- a) Find  $\alpha$  cuts and strong  $\alpha$  cuts for the fuzzy following set for  $\alpha = 0.2, 0.5, 0.8$  and 1.

$$A(x) = \frac{x}{x^2+5} \text{ and } B(x) = 1 - \frac{1}{x+1} \text{ for } x \in [0,1,2, \dots, 10] = X$$

- b) Two uniform bars are connected by pins at  $A$  and  $B$  and supported at  $A$ . A horizontal force  $P$  acts at  $C$ . Knowing the force, length of bars and its weight determine the equilibrium configuration of the system if friction at all joints are neglected,  $0 \leq \theta_1, \theta_2 \leq 90$ .



Randomly generated 8-bit strings representing angles  $\theta_1$  and  $\theta_2$  are :

1010 1001

0010 0011

0001 1110

1000 1101

Compute fitness function given following parameters:

$$P = 3, W_1 = 2, W_2 = 2, l_1 = 1, l_2 = 1$$

- c) For the problem in V(2) above compute the population using Tournament selection method. Use following random selection of individuals: 4 and 2, 2 and 3, 1 and 3, 1 and 4.

<b>Seat No.</b>	
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**M.Sc. (Semester - IV) (Old) (CBCS) Examination: Oct/Nov-2022**  
**(COMPUTER SCIENCE)**  
**Data Mining and Warehouse**

Day & Date: Wednesday, 22-02-2023

Max. Marks: 70

Time: 03:00 PM To 06:00 PM

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

**Q.1** Choose the correct alternative: **14**

- 1) An agglomerative hierarchical clustering method uses a \_\_\_\_\_ strategy.
  - a) Top-down
  - b) Bottom-up
  - c) Random
  - d) None of these
- 2) A divisive hierarchical clustering method employs a \_\_\_\_\_ strategy.
  - a) Top-down
  - b) Bottom-up
  - c) Random
  - d) None of these
- 3) AGNES stands for \_\_\_\_\_.
  - a) AGlomerative Next Searching
  - b) Advanced Group NESTing
  - c) AGglomerative NESTing
  - d) None of these
- 4) The deeper the abstraction level, the smaller the corresponding threshold.
  - a) Reduced Support
  - b) Same support
  - c) Uniform support
  - d) Minimum support
- 5) An \_\_\_\_\_ system manages current data.
  - a) OLAP
  - b) OLTP
  - c) OLEP
  - d) None of these
- 6) \_\_\_\_\_ is a subjects-oriented, integrated, time-variant, non-volatile collection of data in support of management's decision making process.
  - a) Data Mining
  - b) Text Mining
  - c) Document Mining
  - d) Data Warehouse
- 7) The \_\_\_\_\_ schema is a variant of the star schema model.
  - a) Snowflake schema
  - b) Star schema
  - c) Fact constellation schema
  - d) Hybrid schema

- 8) The \_\_\_\_\_ operation performs aggregation on a data cube, either by climbing up a concept hierarchy for a dimension or by dimension reduction.
  - a) Roll-up
  - b) Drill-down
  - c) Drill-rotate
  - d) Rule-up
- 9) A \_\_\_\_\_ is a set of views over operational databases.
  - a) Enterprise warehouse
  - b) Data Mart
  - c) Virtual warehouse
  - d) Refresh
- 10) \_\_\_\_\_, which converts data from legacy or host format to warehouse format.
  - a) Refresh Data
  - b) Data Transformation
  - c) Data Cleaning
  - d) Data Extraction
- 11) Concept hierarchy is a powerful form of \_\_\_\_\_.
  - a) Task Relevant data
  - b) Kinds of Knowledge
  - c) Interestingness measure
  - d) Background Knowledge
- 12) Association rules that satisfy both the minimum confidence and support threshold are referred to as \_\_\_\_\_.
  - a) Strong association rules
  - b) Weak association rule
  - c) General Association Rule
  - d) None of these
- 13) The same minimum support threshold is used when mining at each abstraction level is referred as: \_\_\_\_\_.
  - a) Reduced Support
  - b) Same support
  - c) Uniform support
  - d) Minimum support
- 14) The class label of each training tuple is provided, this step is known as : \_\_\_\_\_.
  - a) Supervised learning
  - b) Self learning
  - c) Unsupervised learning
  - d) None of these

**Q.2 A) Answer the following. (Any four)**

08

- 1) What is Information gain?
- 2) What is Data Cleaning? Explain in short.
- 3) Explain operation-derived hierarchies.
- 4) What is Metadata Repository? Explain in short.
- 5) State and explain different types of data used cluster analysis in short.

**B) Write Notes on. (Any two)**

06

- a) Prediction
- b) FP-Tree
- c) Reduced support

- Q.3 A) Answer the following. (Any Two) 08**
- a) What is data mining? Explain 'Kind of knowledge to be mined' as a primitive.
  - b) What is Association Rule? Explain mining in multi-level hierarchy.
  - c) Explain various applications of data mining.
- B) Answer the following. (Any One) 06**
- a) What is data cube? Explain different types of schemas for multidimensional model.
  - b) Define Data warehouse. Explain various OLAP operations with example.
- Q.4 A) Answer the following. (Any Two) 10**
- a) Explain Decision tree induction method with example.
  - b) What is cluster analysis? Explain Agglomerative hierarchical clustering method with example.
  - c) Explain the procedure of Apriori algorithm with suitable example.
- B) Answer the following. (Any One) 04**
- a) Explain Market Basket Analysis in Association rule.
  - b) Explain different issues regarding with classifications.
- Q.5 Answer the following. (Any Two) 14**
- a) Explain k-means algorithm with suitable example.
  - b) Explain the architecture of Data warehouse with well labelled diagram.
  - c) What is classification?? Bayesian classification with suitable example.

Max. Marks: 70

<b>Q.1</b>	<b>Multiple Choice Questions.</b>	<b>14</b>
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- Page 1 of 3

- 9) Which among the following is NOT true of modern cryptography?
- a) Key is secret
  - b) Algorithm is secret
  - c) Works with bits
  - d) Provides not just confidentiality but also integrity and many other things
- 10) Digital Signature provides
- a) Authentication
  - b) Non repudiation
  - c) both (a) and (b)
  - d) Neither (a) nor (b)
- 11) What is the building block behind symmetric key algorithms?
- a) Diffusion+Confusion
  - b) One-way functions with trap doors
  - c) One-way functions without trap doors
  - d) Two-way functions without trap doors
- 12) Which among the following is NOT a property of a good cipher?
- a) Encryption with key is polynomial
  - b) Decryption with key is non-polynomial
  - c) Larger key space implies stronger cipher
  - d) Cipher should be computationally secure
- 13) When A wants to communicate with B using symmetric key algorithms, how many keys are needed?
- a) 1
  - b) 2
  - c) 4
  - d) 8
- 14) What is the key space of the mono-alphabetic cipher?
- a) 26
  - b)  $2^{26}$
  - c) 26!
  - d)  $26^2$

**Q.2 A) Answer the following (any four) 08**

- a) Define Encryption.
- b) Differentiate between Symmetric key and Asymmetric key.
- c) How digital signature works?
- d) What do you mean by DES?
- e) Write the Applications of Network Security.

**B) Answer the following (any two) 06**

- a) What is hashing? Explain.
- b) Write a note on "Threats and Risks"
- c) How Internet security protocol works?

**Q.3 A) Answer the following (any two) 08**

- a) Write a RSA algorithm.
- b) Differentiate Hashes Vs Encryption
- c) Explain the term "Kerberos".

**B) Answer the following (any one) 06**

- a) Describe the Services of firewall.
- b) Discuss the significance of Totient function.

- Q.4 A) Answer the following (any two) 10**
- a) Explain the concept of Cipher Block Chaining (CBC)
  - b) Write a note on "Packet filtering"
  - c) If A wants to send message to B then discuss the traditional encryption and decryption technique.
- B) Answer the following (any one) 04**
- a) How crypto analysis is done? Discuss.
  - b) What do you non repudiation? Explain.
- Q.5 Answer the following (any two) 14**
- a) Describe the access control models.
  - b) What is encryption? Explain the different types of encryption techniques.
  - c) Describe the components of Web security.