

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
OBJECT ORIENTED PROGRAMMING USING C++

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) What does your class can hold?
 - a) data
 - b) functions
 - c) both a & b
 - d) none of the these
- 2) Where does the execution of the program starts?
 - a) user-defined function
 - b) main function
 - c) void function
 - d) none of these
- 3) A ___ is a collection of objects of similar type.
 - a) class
 - b) inheritance
 - c) operator
 - d) object
- 4) The operator << is known _____ operator.
 - a) extraction
 - b) bit-wise
 - c) increment
 - d) insertion
- 5) The header file _____ should be included at the beginning of all programs that use input/output statements.
 - a) graphics.h
 - b) iostream.h
 - c) manip.h
 - d) math.h
- 6) What does inheritance allows you to do?
 - a) create hierarchy of classes
 - b) create a class
 - c) access method
 - d) none of these
- 7) Which of the following cannot be friend?
 - a) function
 - b) class
 - c) object
 - d) operator function
- 8) Which of the following concepts means wrapping up of data and functions together?
 - a) Abstraction
 - b) Encapsulation
 - c) Inheritance
 - d) Polymorphism
- 9) What is the default visibility mode for members of classes in c++?
 - a) Private
 - b) Public
 - c) Protected
 - d) Depends
- 10) How we can define member function outside the class?
 - a) using union
 - b) using structure
 - c) using pointers
 - d) using scope resolution

- B) State following statements are True or False** **04**
- 1) The virtual function must be members of some class.
 - 2) We cannot overload ++ operator.
 - 3) A derived class with only one base class is called single inheritance
 - 4) Constructor should be declared in the public section.
- Q.2 A) Write short notes on the following** **08**
- 1) Function prototyping
 - 2) Static member function
- B) Answer the following** **06**
- 1) What is Flowchart? Explain the use of basic symbols used in flowchart
 - 2) What is Class? Explain the difference between class and structure.
- Q.3 Answer the following** **14**
- a) Explain the concept of call by reference and return by reference with suitable example.
 - b) Write a C++ program to create a class to read time in seconds and convert into time in (HH:MM:SS) format.
- Q.4 Answer the following** **14**
- a) What is constructor? Explain the use of multiple constructors in a class with example
 - b) Write a C++ program print the Diagonal of matrix of order 3 x 3.
- Q.5 Answer the following.** **14**
- a) What is function overloading? Explain the procedure of function overloading with syntax and suitable example.
 - b) What is inheritance? Explain Multilevel inheritance with suitable example.
- Q.6 Answer the following.** **14**
- a) What is virtual Function? Explain the rules for virtual functions.
 - b) Write a C++ program to implement + operator using operator overloading concept.
- Q.7 Answer the following.** **14**
- a) What is manipulator? Explain width(), precision() and fill() with suitable example.
 - b) What is file? Explain the different types of modes of file with syntax and example.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
DATA STRUCTURES

Time: 2½ Hours

Max. Marks: 70

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

Q.1 A) Choose correct alternatives. 10

- 1) A binary search tree whose left sub-tree and right sub-tree differ in height by at most 1 unit is called _____.
 - a) AVL tree
 - b) Red-black tree
 - c) Lemma tree
 - d) None of the above
- 2) Stack is also called as _____.
 - a) Last in first out
 - b) First in last out
 - c) Last in last out
 - d) First in first out
- 3) _____ is not the component of data structure.
 - a) Operations
 - b) Storage Structures
 - c) Algorithms
 - d) None of above
- 4) Inserting an item into the stack when stack is not full is called _____ operation and deletion of item form the stack, when stack is not empty is called _____ operation.
 - a) push, pop
 - b) pop, push
 - c) insert, delete
 - d) delete, insert
- 5) _____ is very useful in situation when data have to stored and then retrieved in reverse order.
 - a) Stack
 - b) Queue
 - c) List
 - d) Link list
- 6) What of the following is non-liner data structure?
 - a) Stacks
 - b) List
 - c) Strings
 - d) Trees
- 7) Which data structure is used in breadth first search of a graph to hold nodes?
 - a) Stack
 - b) Queue
 - c) Tree
 - d) Array
- 8) Which of the following data structure is linear type?
 - a) Graph
 - b) Trees
 - c) Binary tree
 - d) Stack
- 9) In _____, search start at the beginning of the list and check every element in the list.
 - a) Linear search
 - b) Binary search
 - c) Hash Search
 - d) Binary Tree search
- 10) Which of the following is not the internal sort?
 - a) Insertion sort
 - b) Bubble sort
 - c) Merge Sort
 - d) Heap Sort

- B) State following statements are True or False. 04**
- 1) Binary search is used for searching in a sorted array.
 - 2) In the infix form, the operator precedes the two operands.
 - 3) The queue operated in First in first out.
 - 4) The degree of root node is always zero.
- Q.2 A) Write short notes on the following. 08**
- 1) Dynamic programming
 - 2) Complexity of algorithm
- B) Answer the following. 06**
- 1) Enlist any five basic operations to process data in data structure. Explain any one with example.
 - 2) Enlist any four derived data types and explain any one.
- Q.3 Answer the following. 14**
- A) State the steps to implement push and pop operations of a stack.**
- B) Illustrate and write the procedure to insert and delete a data in a queue with an example.**
- Q.4 Answer the following. 14**
- A) Convert the following infix to postfix notation**
 $(K + L) * (M - N) ^ O * P$
- B) Write an algorithm to delete a node from linked list.**
- Q.5 Answer the following. 14**
- A) List the steps for sorting the following numbers using insertion sort.**
5, 2, 6, 9, 12, 21, 36
- B) Write an algorithm for merge sort. State the complexity to sort 'n' numbers.**
- Q.6 Answer the following. 14**
- A) Write an algorithm to convert infix to postfix using stack.**
- B) Construct a binary tree, given the preorder sequence.**
a b c e i f j d g h k l
- Q.7 Answer the following. 14**
- A) Write an algorithm to implement Breadth first search.**
- B) What is binary tree? Write algorithm to construct a binary search tree.**

| | |
|----------|--|
| Seat No. | |
|----------|--|

**M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
SOFTWARE ENGINEERING**

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) If every requirement stated in the Software Requirement Specification (SRS) has only one interpretation, SRS is said to be _____.
 - a) Correct
 - b) Unambiguous
 - c) Consistent
 - d) Verifiable.
- 2) SRS is also known as specification of _____.
 - a) White box testing
 - b) Stress testing
 - c) Integrated testing
 - d) Black box testing
- 3) The feature of the object oriented paradigm which helps code reuse is _____.
 - a) Object
 - b) Class
 - c) Inheritance
 - d) Aggregation
- 4) Structured charts are a product of _____.
 - a) Requirements gathering
 - b) Requirements analysis
 - c) Design
 - d) Coding
- 5) For a function of two variables, boundary value analysis yields
 - a) $4n + 3$ test cases
 - b) $4n + 1$ test cases
 - c) $n + 4$
 - d) None of the above
- 6) If the objects focus on the problem domain, then we are concerned with
 - a) Object Oriented Analysis
 - b) Object Oriented Design
 - c) Object Oriented Analysis & Design
 - d) None of the above
- 7) The worst type of coupling is _____.
 - a) Data coupling
 - b) Control coupling
 - c) Stamp coupling
 - d) Content coupling
- 8) Which one of the following is not a step of requirement engineering?
 - a) Elicitation
 - b) Design
 - c) Analysis
 - d) Documentation
- 9) The user system requirements are the parts of which document?
 - a) SDD
 - b) SRS
 - c) DDD
 - d) DRS
- 10) Which one of the following is not a fundamental activity for software processes in software engineering?
 - a) Software verification
 - b) Software validation
 - c) Software design and implementation
 - d) Software evolution

- B) State following statements are True or False. 04**
- 1) In the context of requirements analysis, partitioning result in the elaboration of data, function or behavior.
 - 2) Units and stubs are not needed for unit testing because the modules are tested independently of one another.
 - 3) The goal of quality assurance is to provide management with the data needed to determine which software engineers are producing the most defects.
 - 4) The software metrics chosen by an organization are driven by the business or technical goals an organization wishes to accomplish.
- Q.2 A) Write short notes on the following. 08**
- 1) Evolving role of software
 - 2) Metrics for software quality
- B) Answer the following. 06**
- 1) Explain Elements of the analysis model.
 - 2) Write a note on Design methods-Data design.
- Q.3 Answer the following. 14**
- A) Explain Control structure testing.**
- B) Write a note on Transform and Transaction mappings.**
- Q.4 Answer the following. 14**
- A) Explain management of object-oriented software projects.**
- B) Write a note on procedural design.**
- Q.5 Answer the following. 14**
- A) Explain the linear sequential model.**
- B) Write a note on data modeling and functional modeling.**
- Q.6 Answer the following. 14**
- A) Explain the Architectural design and process.**
- B) What is basis of path testing & control structure testing? Explain it in detail.**
- Q.7 Answer the following. 14**
- A) Differentiate black box testing and white box testing.**
- B) Explain the mechanics of structured analysis.**

| | |
|-----------------|--|
| Seat No. | |
|-----------------|--|

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
OPERATING SYSTEM

Time: 2½ Hours

Max. Marks: 70

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

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

- Page making process from main memory to disk is called _____.
 - Interruption
 - Termination
 - Swapping
 - None of the above
- Remote computing service involves the use of time sharing and _____.
 - Multiprocessing
 - Interactive processing
 - Batch processing
 - Socket
- Which scheduling policy is most suitable for time shared operating system?
 - SJF
 - FCFS
 - Round-robin
 - All of the above
- _____ of the distributed file system are dispersed among various machines of distributed system.
 - Client
 - Server
 - Storage devices
 - All of the above
- Bankers algorithm is used for ____ purpose.
 - Deadlock avoidance
 - Deadlock removal
 - Deadlock prevention
 - All of the above
- By using the specific system call, we can _____.
 - Open the file
 - Read the file
 - Write into file
 - All of the above.
- The principle of locality of reference justifies the use of _____.
 - Virtual memory
 - Interrupts
 - Cache memory
 - Secondary memory
- Which one of the following is not a valid state of a thread _____.
 - Running
 - Parsing
 - Ready
 - All of the above
- _____ synchronizes critical resources to prevent deadlock.
 - p-operator
 - v-operator
 - Semaphore
 - swapping
- Variable partition memory management technique with compaction results in _____.
 - Reduction in fragmentation
 - Minimal usage
 - Segment
 - All of the above

- B) State following statements are True or False. 04**
- 1) Thrashing implies excessive page I/O.
 - 2) Fragmentation is dividing the main memory into equal size fragments.
 - 3) Page fault is an error in specific page.
 - 4) Fork is the creation of new process.
- Q.2 A) Write short notes on the following. 08**
- 1) Mutual exclusion.
 - 2) Segmentation.
- B) Answer the following. 06**
- 1) Explain various states of process.
 - 2) What is thread? Explain in details.
- Q.3 Answer the following. 14**
- A) What is a system call? Explain the various types of system call provided by operating system.**
- B) What is semaphore? Discuss producer-consumer problem with semaphore.**
- Q.4 Answer the following. 14**
- A) Briefly explain about single level, two level and tree structured directories.**
- B) Discuss various methods for the prevention of deadlock.**
- Q.5 Answer the following. 14**
- A) Explain in detail indexed file allocation method.**
- B) What is paging? Discuss paging model of logical and physical memory.**
- Q.6 Answer the following. 14**
- A) Explain and compare the FCFS and SJF disk scheduling algorithms.**
- B) What are the methods of free space management of disk?**
- Q.7 Answer the following. 14**
- A) What is the meaning of the terms access right and domain.**
- B) Explain advantages and disadvantages of distributed systems over centralized system.**

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
DBMS

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) The _____ defines the way of connecting or relating two or more entities together.
 - a) Relationship
 - b) Connectivity
 - c) Robustness
 - d) None of these
- 2) The Entity Relationship model comes under.
 - a) Object based logical model
 - b) Record based logical model
 - c) Physical data model
 - d) Semantic data model
- 3) A _____ ensures that transactions execute atomically?
 - a) Integrity control algorithm
 - b) Local applications
 - c) Concurrency control algorithm
 - d) None of the above
- 4) Relational calculus is
 - a) Procedural language
 - b) Non-procedural language
 - c) Data definition language
 - d) High level language
- 5) Data independence means
 - a) Data is defined separately and not included in programs
 - b) Programs are not dependent on the physical attributes of data
 - c) Programs are not dependent on the logical attributes of data
 - d) Both (b) and (c)
- 6) A locked file can be
 - a) Accessed by only our user
 - b) Modified by users with the correct password
 - c) Is used to hind sensitive information
 - d) Both (b) and (c)
- 7) Which normal form is considered adequate for relational database design?
 - a) 2 NF
 - b) 3 NF
 - c) 4 NF
 - d) BCNF
- 8) The functions Avg() Count(), Max() and Min()
 - a) Supported only by SQL
 - b) Supported only by QBE
 - c) Supported by both SQL and QBE
 - d) Supported by none
- 9) An entity set that does not have sufficient attributes to form a primary key is a
 - a) Strong entity set
 - b) Weak entity set
 - c) Simple entity set
 - d) Primary entity set

- 10) An index file is an example of
- a) Sequential file
 - b) Main memory data block
 - c) Application of indices
 - d) None of the above
- B) State following statements are True or False** **04**
- 1) The external view determines how the data are actually stored in some physical storage unit in the computer system.
 - 2) Collection of related records is known as tuple
 - 3) In a distributed database storage devices are not all attached to a common CPU.
 - 4) A concurrency control algorithm ensures that transactions execute atomically.
- Q.2 A) Write short notes on the following** **08**
- a) Data Independence
 - b) Serialization
- B) Explain the following terms?** **06**
- a) Explain Log based recovery in brief.
 - b) Explain in brief advantages of Views in SQL?
- Q.3 Answer the following**
- a) Explain the concept of distributed database. **07**
 - b) Define DBMS. Explain advantages and disadvantages of DBMS. **07**
- Q.4 Answer the following**
- a) What is meant by Normalization? Explain 1 NF and 2 NF with suitable example. **07**
 - b) Explain the concept of shadowing in database recovery. **07**
- Q.5 Answer the following.** **07**
- a) Define Relational algebra. Explain fundamental relational algebraic operations. **07**
 - b) Explain ACID properties of transaction with suitable example.
- Q.6 Answer the following.**
- a) What is meant by entity sets? Explain the difference between strong entity sets and weak entity sets. **07**
 - b) What is meant by database recovery? Explain the need for recovery. **07**
- Q.7 Answer the following.**
- a) Explain two ways of data fragmentation with example? **07**
 - b) Explain aggregate functions and character functions used in SQL? **07**

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Computer Science
JAVA PROGRAMMING

Time: 2½ Hours

Max. Marks: 70

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

Q.1 A) Choose correct alternatives. 10

- 1) What is the range of data type short in Java?
 - a) -128 to 127
 - b) -32768 to 32767
 - c) -2147483648 to 2147483647
 - d) None of the mentioned
- 2) Which of these keywords is used to refer to member of base class from a sub class?
 - a) Upper
 - b) Super
 - c) This
 - d) None of the above
- 3) `int x = 0, y = 0, z = 0 ;`
`x = (++x + y --) * z++;`
 What will be the value of "x" after execution?
 - a) -2
 - b) 1
 - c) 0
 - d) 4
- 4) String in Java is a?
 - a) Class
 - b) Object
 - c) Variable
 - d) Character array
- 5) Which of the following statements are incorrect?
 - a) String is a class
 - b) Strings in java are mutable
 - c) Every sting is an object of class string.
 - d) Java defines a peer class of string, called StringBuffer, which allows string to be altered.
- 6) What is the return type of Constructors?
 - a) int
 - b) float
 - c) void
 - d) None
- 7) Which of the following class definitions defines a legal abstract class?
 - a) `class A {abstract void unfinished() { } }`
 - b) `class A {abstract void unfinished(); }`
 - c) `abstract class A {abstract void unfinished(); }`
 - d) `public class abstract A {abstract void unfinished(); }`
- 8) Which of the following package stores all the standard java classes?
 - a) lang
 - b) java
 - c) util
 - d) java.packages
- 9) In java a thread can be created by _____.
 - a) By extending Thread Class
 - b) By extending Object Class
 - c) By extending Exception class
 - d) None

10) Which of these operators is used to allocate memory to array variable in Java?

- a) malloc
- b) alloc
- c) new
- d) new malloc

B) State following statements are True or False. 04

- 1) run() method of Thread class to start that thread.
- 2) It is necessary to use new operator to initialize an array.
- 3) File class is related to input and output stream in terms of functioning.
- 4) Java is distributed language.

Q.2 A) Write short notes on the following. 08

- 1) Primitive data types in Java.
- 2) 'if – else' statement.

B) Answer the following. 06

- 1) Explain the role of JVM.
- 2) What is meant by platform independent language? Why Java is used for web programming?

Q.3 Answer the following. 14

- A)** Design a simple applet to display string in it and place it in html file.
- B)** Describe the steps to create package.

Q.4 Answer the following. 14

- A)** How to prevent a particular class from being inherited by other classes? How to prevent the particular members of super class from being overridden in subclass?
- B)** What is Thread? Explain the lifecycle of thread.

Q.5 Answer the following. 14

- A)** Write program to calculate sum digits of an integer.
- B)** Differentiate the Method Overloading and Method overriding with example.

Q.6 Answer the following. 14

- A)** Write a program to read a text file and display the output on output device.
- B)** Define Exception? How to create the use defined exception?

Q.7 Answer the following. 14

- A)** What is sting? Write any five methods to manipulate string.
- B)** Explain in detail every listener interfaces.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Computer Science
COMPUTER COMMUNICATION NETWORK

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) In a _____ connection, more than two devices can share a single link
 - a) Point-to-point
 - b) Multipoint
 - c) Primary
 - d) Secondary
- 2) A _____ is a data communication system within a building, plant, or campus, or between nearby buildings.
 - a) MAN
 - b) LAN
 - c) WAN
 - d) None of the above
- 3) Which one of the following is the multiple access protocol for channel access control?
 - a) CSMA/CD
 - b) CSMA/CA
 - c) Both (A) and (B)
 - d) None of the mentioned
- 4) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
 - a) Piggybacking
 - b) Cycling redundancy check
 - c) Fletcher's checksum
 - d) None of the mentioned
- 5) Which one of the following algorithm is not used for congestion control?
 - a) Traffic aware routing
 - b) Admission control
 - c) Load shedding
 - d) None of the mentioned
- 6) CMP is primarily used for
 - a) Error and diagnostic functions
 - b) Addressing
 - c) Forwarding
 - d) None of the mentioned
- 7) A _____ is a TCP name for a transport service access point.
 - a) Port
 - b) Pipe
 - c) Node
 - d) None of the mentioned
- 8) Which one of the following is a transport layer protocol?
 - a) Stream control transmission protocol
 - b) Internet control message protocol
 - c) Neighbor discovery protocol
 - d) Dynamic host configuration protocol
- 9) E-mail is
 - a) Loss-tolerant application
 - b) Bandwidth-sensitive application
 - c) Elastic application
 - d) None of the mentioned

- 10) Which of the following is an application layer service?
- Network virtual terminal
 - File transfer, access and management
 - Mail service
 - All of the mentioned

B) Fill in the blanks. 04

- _____ is a collection of many separate networks.
- To deliver a message to the correct application program running on a host, the _____ address must be consulted.
- _____ is the multiple access protocol for channel access control.
- Subnet of 194.24.0.8/22 is _____

Q.2 A) Solve following. 08

- A computer on a 6 Mbps network is regulated by token bucket. The token bucket is filled at a rate of 1 Mbps. It is initially filled to capacity with 8 megabits. How long can the computer transmit at the full 6Mbps?
- What is the CRC code of Frame 1 1 0 1 0 1 1 0 1 1 Using the generator code 1 0 0 1 1

B) Write a short note on. 06

- Jitter Control
- Piggybacking

Q.3 Answer the following. 14

- An 8-bit byte with binary value 10101111 is to be encoded using even-parity Hamming code. What is the binary value after encoding?
- What is the static web document? Explain how to use HTML in web development.

Q.4 Answer the following. 14

- Explain the TCP Connection Management Modeling in details.
- Explain the Term Transport protocols, Addressing, Connection Rerelease.

Q.5 Answer the following. 14

- What are the IP address and subnets? Explain with example.
- Write a note on RARP, BOOTP and DHCP

Q.6 Answer the following. 14

- What are the conjunction factors in computer network? Explain any two with example.
- What is network? Explain the uses of computer network.

Q.7 Answer the following. 14

- What is the principal of ICMP message? Explain the ARP.
- What is sliding windows protocol? Explain one-bit sliding windows protocol.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Computer Science
UML

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) What are the notations for the use case diagram
 - a) Use case
 - b) Prototype
 - c) Actor
 - d) Both (A) and (C)
- 2) Which among these are the common notations for deployment diagrams?
 - a) Artifacts and nodes
 - b) Stereotypes
 - c) Components
 - d) All of the above
- 3) Which among these are the rules to be considered to form class diagram?
 - a) Class symbols must have at least a name compartment
 - b) Compartment can be in a random order
 - c) Attributes and operations can be listed at any suitable place
 - d) None of the above.
- 4) What encapsulates both data and data manipulation functions?
 - a) Class
 - b) Object
 - c) Super class
 - d) Sub class
- 5) In UML diagram of a class
 - a) state of object cannot be represented
 - b) state is irrelevant
 - c) state is represented as an attribute
 - d) state is represented as a result of an operation
- 6) UML stands for
 - a) Universal Metadata Language
 - b) Universal Modeling Language
 - c) Unified Micro Language
 - d) Unified Modeling Language
- 7) A class is
 - a) A group of objects
 - b) Template for objects of a particular type
 - c) A class of objects
 - d) A classification of objects
- 8) What is the programming style of the object oriented conceptual model?
 - a) Invariant relationships
 - b) Algorithms
 - c) Classes & Objects
 - d) Goal often expressed in a predicate calculus

- 9) Super class represents _____ abstractions
 a) Generalized abstractions b) Specialization abstractions
 c) Both(a) and (b) d) None of the above
- 10) Which among the following are not the valid notations for package and component diagram?
 a) Nodes b) Box
 c) Extension mechanism d) Packages

B) State True or False. 04

- 1) Dependency relation holds between two entities D & I were change in I does not affect D.
- 2) The main way to extend UML is by constraints, properties etc.
- 3) A note is a dog-eared box connected to any model element by a dashed line.
- 4) A stereotype is a UML model element given more specific meaning.

Q.2 A) Write short notes on the following. 08

- 1) Time and space
- 2) Relationship in structural modeling

B) Answer the following. 06

- 1) Priority call back Mechanism
- 2) Deployment diagrams.

Q.3 Answer the following.

- A) Explain how encapsulation and information hiding is important in UML. 07**
B) Draw and explain the use case diagram for electricity bill payment system. 07

Q.4 Answer the following.

- A) What is a package? How it is represented in UML? Describe importing and exporting packages. 07**
B) What are the benefits of sequence diagrams? Draw the sequence diagram for making a hotel reservation system. 07

Q.5 Answer the following.

- A) What are the advantages of UML? Explain object oriented design process. 07**
B) Explain the terms, concepts used for modeling techniques in component diagrams. 07

Q.6 Answer the following.

- A) Draw the use case diagram for online digital library system. 07**
B) Explain in detail the common mechanism used in structural modeling. 07

Q.7 Answer the following.

- A) Explain generalization and specialization in detail. 07**
B) What is active class? Write the difference between normal class and active class. 07

| | |
|----------|--|
| Seat No. | |
|----------|--|

**M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Computer Science
SOFTWARE TESTING**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.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 the correct alternative: 10

- 1) _____ testing tests the interfaces between components, interactions to different parts of the system.
 - a) Integration
 - b) Performance
 - c) Black Box
 - d) None of these
- 2) In _____ model, the outcome of one phase acts as the input for the next phase sequentially.
 - a) Spiral
 - b) Waterfall
 - c) Iterative
 - d) None of these
- 3) _____ testing not only verifies a code as per the design specifications but also uncovers any vulnerability.
 - a) Black Box
 - b) Regression
 - c) White Box
 - d) None of these
- 4) A _____ is a measure of the degree to which a system, system components or processes a given attribute.
 - a) Metric
 - b) Usability
 - c) Automation
 - d) None of these
- 5) _____ testing are often heavily documented and used time and again.
 - a) Unit
 - b) Performance
 - c) Scenario
 - d) None of these
- 6) During _____ testing the test cases are prioritized depending upon the changes done to the feature or module in the application.
 - a) System
 - b) Usability
 - c) Regression
 - d) None of these
- 7) _____ is a process of adapting internationalized software for a specific region or language.
 - a) Localization
 - b) Integration
 - c) Unit
 - d) None of these
- 8) _____ testing is a subset of usability testing where in the users under consideration are people with all abilities and disabilities.
 - a) Performance
 - b) Accessibility
 - c) Black box
 - d) None of these
- 9) _____ Testing is a software testing technique in which the software is tested without executing the code.
 - a) Structural
 - b) Integration
 - c) Static
 - d) None of these

10) _____ Model allows for the elements of the product to be added in when they become available or known.

- a) Spiral
- b) RAD
- c) Waterfall
- d) None of these

B) State whether the following statements are True or False **04**

- 1) Performance Testing and Tuning is one and the same thing.
- 2) Good test case has a reasonable probability of catching an error.
- 3) Devising a set of test cases that will guarantee that all errors will be detected is somewhat feasible.
- 4) Performance, load, and stress tests are subcategories of performance testing, each intended for a different purpose.

Q.2 A) Attempt the following question: **08**

- 1) Explain Automation Syndrome if brief.
- 2) What is Quality Control? Explain with example.

B) Write a short note on following **06**

- 1) Acceptance Testing
- 2) Scope of Automation

Q.3 A) Discuss Structural Testing with an example. **07**

B) Explain Primer on Internationalization in brief. **07**

Q.4 A) What are the Challenges in White Box Testing? **07**

B) Explain why to do Black Box Testing? **07**

Q.5 A) Elaborate on Product Accessibility with an example **07**

B) Discuss Scenario Testing & Defect Bash. **07**

Q.6 A) What is the methodology for Performance Testing? **07**

B) Discuss Enabling Testing in brief. **07**

Q.7 Answer the following.

A) Elaborate on Non Functional System Testing with an example. **07**

B) Explain the Differences in OO Testing. **07**

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
DIGITAL IMAGE PROCESSING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) The wavelength of 0.83 μm belongs to _____.
 - a) near infrared
 - b) visible blue
 - c) visible red
 - d) visible green
- 2) An image with 256 gray levels is having 256 rows. If its size is 32 KB, how many columns are there?
 - a) 4
 - b) 16
 - c) 64
 - d) 128
- 3) Methods used to generate a pre-processed image with a specified histogram are _____.
 - i) Histogram equalization,
 - ii) Histogram specification
 - iii) Histogram matching
 - a) (i) and (ii)
 - b) (i) and (iii)
 - c) (ii) and (iii)
 - d) (i), (ii) and (iii)
- 4) Fourier transform separates the function into various components based on _____.
 - a) pixel location
 - b) pixel intensity
 - c) frequency
 - d) all above
- 5) Which of the following is odd when application of noise reduction technique is considered?
 - a) impulse noise
 - b) periodic noise
 - c) Rayleigh noise
 - d) Gaussian noise
- 6) Dilation uses _____.
 - i) Reflection,
 - ii) Translation,
 - iii) Intersection
 - a) (i) and (ii)
 - b) (i) and (iii)
 - c) (ii) and (iii)
 - d) (i), (ii) and (iii)
- 7) Computation of derivatives for segmentation is _____.
 - a) filtering on spatial domain
 - b) filtering in frequency domain
 - c) low pass filtering
 - d) high pass filtering
- 8) Digital functions' derivatives are defined as
 - a) addition
 - b) differences
 - c) multiplication
 - d) division

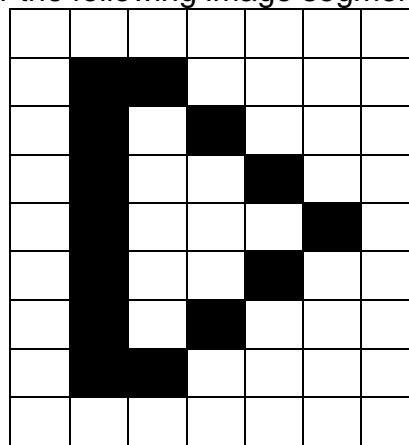
Q.6 Answer the following.

- A) Derive expression for Principal component transform.
- B) Threshold the following image using Global thresholding algorithm. The initial threshold may be selected using the median filter on entire image and the algorithm iteration must stop when difference of threshold is less than 0.1

| | | | |
|-----|-----|-----|-----|
| 195 | 133 | 199 | 89 |
| 142 | 93 | 178 | 209 |
| 149 | 163 | 190 | 210 |
| 169 | 188 | 205 | 177 |

Q.7 Answer the following.

- A) Derive expression for decision boundary using minimum distance classifier.
- B) Perform region filling for the following image segment.



| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
MOBILE COMPUTING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) DECT stand for
 - a) Digital European Cellular Telex
 - b) Digitized Emergency Cellular Telephone
 - c) Digital European Cordless Telephone
 - d) Digital European Cellular Telephone
- 2) 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
- 3) Within a certain radius of the sender transmission is possible, i.e., a receiver receives the signals with an error rate low enough to be able to communicate and can also act as sender.
 - a) Detection Range
 - b) Interference Range
 - c) Transmission range
 - d) Mobile range
- 4) _____ is used for allocating a separated space to users in wireless networks.
 - a) Time Division Multiple Access
 - b) Channel division multiplexing
 - c) Time slots Multiple access
 - d) None of these
- 5) Now, GSM stands for
 - a) Group special mobile
 - b) Global system for mobile communication
 - c) Global system for mobile
 - d) Option (a) and (b)
- 6) TMSI stands for
 - a) Temporary mobile subscriber identify
 - b) Transmission mobile signals interfaces
 - c) Time for multiple signals Interface
 - d) None of the above
- 7) PLCP stands for _____
 - a) Physical layer connection protocol
 - b) Primary Layer connection protocol
 - c) Physical layer convergence protocol
 - d) Physical layer communication protocol
- 8) Bluetooth operates on _____ channels in the 2.4 GHz band with 1 MHz carrier spacing
 - a) 20
 - b) 79
 - c) 80
 - d) 70

- 9) DHCP clients send a request to a server _____ which the server responds.
- | | |
|-----------------|----------------|
| a) DHCPDISCOVER | b) DHCPRECIIVE |
| c) DHCPHOST | d) DHCPPOST |
- 10)MANET stands for _____
- | | |
|--------------------------|-----------------------------------|
| a) Mobile Access Network | b) Mobile ad-hoc networking |
| c) Movable Network | d) Mobile Application for network |

B) State following statements are True or False 04

- 1) Manifest is the configuration file for the android application
- 2) A layout is view hierarchies that control screen format and appearance of the views.
- 3) In bin folder contain the Android package files .ask built by the ADT during the build process and everything.
- 4) res/layout is a directory for files that define android apps interface.

Q.2 A) Write short notes on the following 06

- a) Handover
- b) Android Debugging

B) Answer the following 08

- a) What is signal and Radio frequency?
- b) What is android and explain any two applications?

Q.3 Answer the following 14

- a) What are main benefits of spread spectrum system? How can spreading be achieved?
- b) What are different advantages and disadvantages of cellular systems with small cells?

Q.4 Answer the following 14

- a) Explain in detail Mobile Terminated Call (MTC) and Mobile Originated Call (MOC)
- b) How a Piconet and Scatternet is formed in Bluetooth?

Q.5 Answer the following. 14

- a) Draw the header format for IP-in-IP encapsulation and explain each field.
- b) What is mobile TCP? Describe the term: snooping TCP, I-TCP.

Q.6 Answer the following. 14

- a) What is Android? Explain the architecture and application of android.
- b) Explain android Bluetooth with suitable example?

Q.7 Answer the following. 14

- a) Write android MainActivity.xml and MainActivity.java that determine whether a person age is eligible for blood donor or not?
- b) What is multiplexing? Explain the different techniques.

| | |
|----------|--|
| Seat No. | |
|----------|--|

**M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
ARTIFICIAL INTELLIGENCE**

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) Discourse Integration is used to state the meaning of an individual sentence that may depend on the sentences that _____ it and may influence the meaning of the sentences that follow it.
 - a) Follow
 - b) Precede
 - c) Chase
 - d) None of these
- 2) Measure of disbelief measures the extent to which the evidence supports the _____ of the hypothesis.
 - a) Negation
 - b) Deletion
 - c) Insertion
 - d) Duplication
- 3) _____ script is appropriate to activate the script fully and to attempt to fill in its slot with particular objects and people involved in the current situation.
 - a) Fleeting
 - b) Non-fleeting
 - c) Both (a) and (b)
 - d) None of the above
- 4) _____ produces proofs by refutation.
 - a) Iterative deepening
 - b) Problem reduction
 - c) Resolution
 - d) System Shells
- 5) _____ maintains a network of rule conditions, and it uses changes in the state description to determine which new rules might apply.
 - a) RETE
 - b) SALT
 - c) TEIRESIAS
 - d) MYCIN
- 6) Robot control task belong to the domain of _____ task.
 - a) Formal
 - b) Expert
 - c) Mundane
 - d) Engineering
- 7) The predicate *instance* is a _____ one, whose first argument is an object and whose second argument is a class to which the object belongs.
 - a) Unary
 - b) Binary
 - c) Ternary
 - d) Quarter
- 8) The means-ends analysis process centers for the detection of difference between the current state and the _____ state.
 - a) Original
 - b) Goal
 - c) Start
 - d) Main
- 9) _____ search is good because it does not get trapped on dead-end paths.
 - a) Linear search
 - b) Breadth first search
 - c) Binary search
 - d) Depth first search

10)A _____ symbol system consist a set of entities, called symbols, which are _____ patterns that can occur as components of another type of entity called expression.

- a) Logical
- b) Imperial
- c) Physical
- d) Consistent

B) State following statements are True or False **04**

- 1) Well designed heuristic functions can play an important part in efficiently guiding a search process toward a solution.
- 2) We can search backward through the state space from the start state to a goal state.
- 3) Partially commutative, monotonic production systems can be implemented without the ability to backtrack to previous states when it is discovered that an incorrect path has been followed.
- 4) Using frames, information is represented as a set of nodes connected to each other by a set of labeled arcs, which represent relationship among the nodes.

Q.2 A) Write short notes on the following **08**

- a) Procedural versus Declarative knowledge
- b) Generate and Test

B) Answer the following **06**

- a) What do you mean by Predicate Logic?
- b) What do you mean by Reasoning?

Q.3 Answer the following **07**

- a) What do you mean by MYCIN? Discuss concept of explanation as effective tool of the expert system. **07**
- b) What do you mean by Strong Slot and filler structure? Explain in detail Conceptual dependency with suitable example? **07**

Q.4 Answer the following **07**

- a) List out additional refinements in Minmax procedure. Discuss in detail Alpha-Beta cutoff with suitable example? **07**
- b) What is Syntactic analysis? Explain in detail Syntactic processing using grammars and parser with suitable example? **07**

Q.5 Answer the following. **07**

- a) What do you mean by Natural Deduction? Discuss in detail Computable functions and predicate with suitable example. **07**
- b) What do you mean by Probability? Explain in detail Dempster-Shafer theory? **07**

Q.6 Answer the following. **07**

- a) Define the meaning of AI technique. Discuss in detail water-jug problem with suitable example. **07**
- b) Enlist and discuss in detail different key dimension of problem characteristics. **07**

Q.7 Answer the following. **07**

- a) Discuss in detail Frame as weak slot and filler structure with suitable example. **07**
- b) Discuss in detail Hill climbing and steepest ascent hill climbing as heuristics search strategies. **07**

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
OPERATIONS RESEARCH

Time: 2½ Hours

Max. Marks: 70

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

- Q.1 A) Fill in the blanks:-** **07**
- 1) When more than one activity leaves an event, such event is known as _____
 - 2) The difference between the latest start time and earliest start time of an activity is called as _____
 - 3) The shortest possible time in which the activity can be finished is called as _____
 - 4) If the cost matrix on an assignment problem is not a square matrix then the assignment problem is called as _____
 - 5) A necessary & sufficient condition for the existence of feasible solution of a transportation problem is _____
 - 6) If the primal problem has unbounded solution then dual problem will have _____ solution.
 - 7) The intersection of two convex sets is _____ set
- B) State following statements are True or False** **07**
- 1) Critical path identifies all critical activities of the project
 - 2) A hyperplane in R^n is convex set
 - 3) An extreme point is a boundary point of set
 - 4) There may exists an optimal solution to a balanced transportation problem.
 - 5) To disconnect an activity before the completion of all activities in a network is known as redundancy error.
 - 6) The feasible solution of LPP is a solution which satisfies non-negativity restrictions.
 - 7) The line $3x_1 + 2x_2 = 5$ in R^2 is not a convex set
- Q.2 A) a) State the rules for converting any primal into its dual.** **03**
b) Explain the need of artificial variable. **04**
c) Write a note on critical path. **03**
d) Define convex function. Illustrate with one example. **04**
- Q.3 A) Solve by using Kuhn. Tucker conditions** **08**
 Min $z = 2x_1 + 3x_2$
 subject to the constraints,
 $x_1^2 + x_2^2 \leq 20$, $x_1x_2 \leq 8$ & $x_1, x_2 \geq 0$
- B) Write the algorithm of Big-M method** **06**

- Q.4 A) Explain with examples** **06**
 1) Graphic Matroid
 2) Co-graphic Matroid
B) Solve by using Simplex method **08**
 Max. $z = 3x_1 + 2x_2$
 Subject to the constraints,
 $x_1 + x_2 \leq 4$, $x_1 - x_2 \leq 2$ & $x_1, x_2 \geq 0$

- Q.5 A) What is mean by graphing in Network Analysis?** **04**
B) A project has a following time schedule. **10**

| Activity | Time in Weeks | Activity | Time in Weeks |
|----------|---------------|----------|---------------|
| (1-2) | 4 | (5-7) | 8 |
| (1-3) | 1 | (6-8) | 1 |
| (2-4) | 1 | (7-8) | 2 |
| (3-4) | 1 | (8-9) | 1 |
| (3-5) | 6 | (8-10) | 8 |
| (4-9) | 5 | (9-10) | 7 |
| (5-6) | 4 | | |

Construct PERT network and compute,
 1) T_E, T_L for each event
 2) Float for each activity
 3) Critical path & its duration

- Q.6 A) Solve the minimal assignment problem whose effectiveness matrix is given** **10**
 by

| | | | | |
|-----|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| I | 2 | 3 | 4 | 5 |
| II | 4 | 5 | 6 | 7 |
| III | 7 | 8 | 9 | 8 |
| IV | 3 | 5 | 8 | 4 |

- B) Prove that, A hyperplane in R^n is convex set** **04**

- Q.7 A) Define** **06**
 1) Optimistic time
 2) Pessimistic time
 3) Most likely time
B) P. T. the set of all convex combinations of a finite number of points **08**
 x_1, x_2, \dots, x_m is a convex set.

Seat
No.

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
FINITE AUTOMATA

Time: 2½ Hours

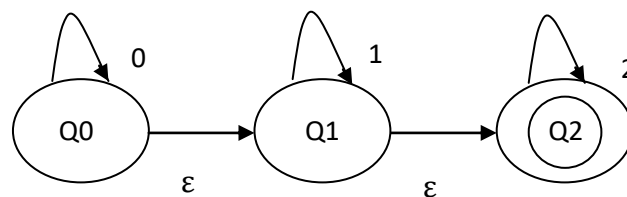
Max. Marks: 70

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

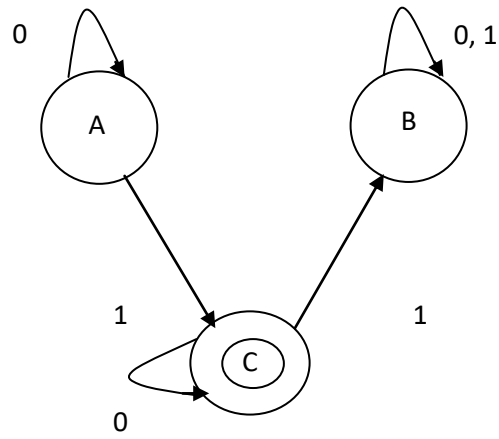
Q.1 A) Choose correct alternatives.**10**

- 1) The transition function of a DFA is
 - a) $Q \times \Sigma \rightarrow Q$
 - b) $Q \times \Sigma \rightarrow 2^Q$
 - c) $Q \times \Sigma \rightarrow 2^n$
 - d) $Q \times \Sigma \rightarrow Q^n$
- 2) Regular languages are closed under _____
 - a) Union
 - b) Intersection
 - c) Both (a) and (b)
 - d) None of these
- 3) In a context free grammar the left hand side of the production rule will be _____
 - a) Terminal
 - b) None-terminal/variable
 - c) Both (a) and (b)
 - d) None of the above
- 4) The regular expression that will accept all the strings that end with ab over {a,b} will be?
 - a) $(a+b)^*ab$
 - b) $a(a+b)^*b$
 - c) $(ab)^*ab$
 - d) $(ab)^*$
- 5) Language of finite automata is _____
 - a) Type 0
 - b) Type 1
 - c) Type 2
 - d) Type 3
- 6) A context free grammar is in CNF if every production is of the form _____
 - a) $A \rightarrow BC$ or $A \rightarrow A$
 - b) $A \rightarrow BC$ or $A \rightarrow a$
 - c) $A \rightarrow a$ or $A \rightarrow B$
 - d) None of the above
- 7) The push down automata indicate the acceptance of input string in terms of
 - a) Final state
 - b) Empty stack
 - c) Both (a) and (b)
 - d) None of the above
- 8) A DPDA is a PDA in which _____
 - a) No state p has two different outgoing transitions for a given input symbol and symbol on top the stack.
 - b) More than one state can have two or more outgoing transitions
 - c) At least one state has more than one transitions
 - d) None of the mentioned
- 9) A language is accepted by a push down automata is
 - a) regular
 - b) context free
 - c) both (a) and (b)
 - d) none of the mentioned
- 10) The following notation belongs to which type of language: $G=(V, T, P, S)$
 - a) Regular grammar
 - b) Context free grammar
 - c) Context sensitive grammar
 - d) All of the mentioned

- B) State following statements are True or False** **04**
- 1) A DFA can have multiple final states.
 - 2) Regular languages are not closed under intersection.
 - 3) The language accepted by PDA is not context free.
 - 4) A Turing machine uses stack as memory.
- Q.2 A) Write short notes on the following** **08**
- 1) What are DPDA and NPDA? Explain with example.
 - 2) What is recursively enumerable language?
- B) Answer the following** **06**
- a) Write regular expression for following languages.
- 1) $L_1 = \{\text{set of all the strings ending with ab over alphabets a and b}\}$
 - 2) $L_2 = \{\text{Set of all the strings that having exactly two 0's over alphabets 0 and 1}\}$
 - 3) $L_3 = \{\text{set of all the possible strings that start with a and end with b over a and b.}\}$
- b) Explain Turing machine with example.
- Q.3 Answer the following**
- a) Construct DFA for a language that accepts all the strings having "aa" and "bb" as substring over {a, b}. **08**
- b) Explain closure properties of a regular language with example. **06**
- Q.4 Answer the following**
- a) Construct PDA for following language **08**
 $L = \{a^m b c^m \mid m \geq 1\}$
- b) Convert the following grammar into CNF. **06**
- $$S \rightarrow BSA \mid \epsilon$$
- $$A \rightarrow aAS \mid a$$
- $$B \rightarrow SbS \mid A \mid b$$
- Q.5 Answer the following.**
- a) What is pumping lemma? Prove that the language $L = \{a^m b^{m+1} \mid m \geq 1\}$ is not regular. **08**
- b) Construct NFA with ϵ -moves for following regular expression **06**
 $(0+1)^* (11+00)^* (0+1)^*$
- Q.6 Answer the following.**
- a) Construct Turing machine for following language. **08**
 $L = \{a^n b^n c^n \mid n \geq 1\}$.
- b) Explain Chomsky hierarchy in detail. **06**
- Q.7 Answer the following.**
- a) Obtain DFA equivalent of following NFA **08**



b) Construct regular expression for following DFA by using Arden's theorem. 06



| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
DIGITAL IMAGE PROCESSING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) The wavelength of 0.83 μm belongs to _____.
 - a) near infrared
 - b) visible blue
 - c) visible red
 - d) visible green
- 2) An image with 265 gray levels is having 256 rows. If its size is 32 KB, how many columns are there?
 - a) 4
 - b) 16
 - c) 64
 - d) 128
- 3) Methods used to generate a pre-processed image with a specified histogram are _____.
 - i) Histogram equalization,
 - ii) Histogram specification
 - iii) Histogram matching
 - a) (i) and (ii)
 - b) (i) and (iii)
 - c) (ii) and (iii)
 - d) (i), (ii) and (iii)
- 4) Fourier transform separates the function into various components based on _____.
 - a) pixel location
 - b) pixel intensity
 - c) frequency
 - d) all above
- 5) Which of the following is odd when application of noise reduction technique is considered?
 - a) impulse noise
 - b) periodic noise
 - c) rayleigh noise
 - d) gaussian noise
- 6) Dilation uses _____.
 - i) Reflection,
 - ii) Translation,
 - iii) Intersection
 - a) (i) and (ii)
 - b) (i) and (iii)
 - c) (ii) and (iii)
 - d) (i), (ii) and (iii)
- 7) Computation of derivatives for segmentation is _____.
 - a) filtering on spatial domain
 - b) filtering in frequency domain
 - C) low pass filtering
 - d) high pass filtering
- 8) Digital functions' derivatives are defined as
 - a) addition
 - b) differences
 - c) multiplication
 - d) division

- 9) An image contains 6 holes, 3 vertices, 7 edges and 4 connected components. How many faces are there?
 a) 2 b) 4
 c) 6 d) 8

- 10) In a problem of classifying different fruits, the types of fruits are known as _____.
 a) pattern vectors b) pattern values
 c) pattern matrix d) pattern classes

B) Fill in the blanks. 04

- 1) The intensity of a pixel in a 9 bit image is 245. Value after applying negative transform is _____.
- 2) Performing enhancement by separating illumination and reflectance components is known as _____ filtering.
- 3) The magnitude and direction of gradient vector used for edge linking using local processing method are _____ and _____.
- 4) The necessary condition for decision boundary separating class ω_i from ω_j given by values of x is _____.

Q.2 A) Write short notes on the following. 08

- 1) Adjacencies.
 2) Fourier transform: its invention and basic properties.

B) Answer the following. 06

- 1) A pixel has intensity 150, $c = 2.5$ and $gamma = 2$, compute its log and power-law transformations.
- 2) Check whether a line with +45 degree inclination exist, if threshold is 400?

| | | |
|-----|----|----|
| 102 | 34 | 90 |
| 42 | 87 | 12 |
| 83 | 22 | 1 |

Q.3 Answer the following. 14

- A) Discuss the fundamental steps of image processing in which input is image and output is attributes of image.
- B) Perform histogram stretching to 0-7 intensity range for the above image information.

| | | | | | | | | |
|----------------------|---|---|-----|---|-----|-----|-----|---|
| Intensity | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of Pixels | 0 | 0 | 100 | 0 | 400 | 300 | 250 | 0 |

Q.4 Answer the following 14

- A) Explain contrast stretching and compare it with gray level slicing.
- B) Perform dilation of an equilateral triangle having 6 cm each using circle of 1 cm radius and square having 2 cm width and 1 cm height.

Q.5 Answer the following. 14

- A) Write algorithm for edge linking through local edge processing.
- B) Perform logical NOT operation on following 8 bit image segment.

| | | | |
|-----|-----|-----|-----|
| 213 | 165 | 39 | 251 |
| 75 | 133 | 9 | 83 |
| 130 | 45 | 201 | 187 |
| 88 | 0 | 43 | 69 |

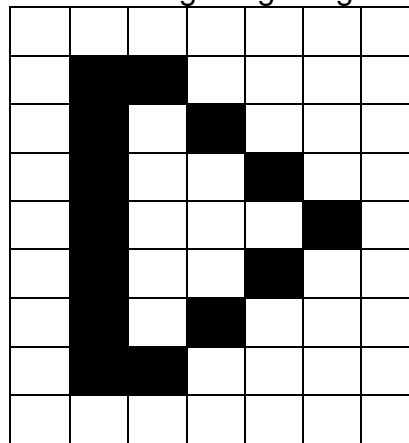
Q.6 Answer the following.

- A) Derive expression for Principal component transform.
- B) Threshold the following image using Global thresholding algorithm. The initial threshold may be selected using the median filter on entire image and the algorithm iteration must stop when difference of threshold is less than 0.1

| | | | |
|-----|-----|-----|-----|
| 195 | 133 | 199 | 89 |
| 142 | 93 | 178 | 209 |
| 149 | 163 | 190 | 210 |
| 169 | 188 | 205 | 177 |

Q.7 Answer the following.

- A) Derive expression for decision boundary using minimum distance classifier.
- B) Perform region filling for the following image segment.



| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
MOBILE COMPUTING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) DECT stand for
 - a) Digital European Cellular Telex
 - b) Digitized Emergency Cellular Telephone
 - c) Digital European Cordless Telephone
 - d) Digital European Cellular Telephone
- 2) 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
- 3) Within a certain radius of the sender transmission is possible, i.e., a receiver receives the signals with an error rate low enough to be able to communicate and can also act as sender.
 - a) Detection Range
 - b) Interference Range
 - c) Transmission range
 - d) Mobile range
- 4) _____ is used for allocating a separated space to users in wireless networks.
 - a) Time Division Multiple Access
 - b) Channel division multiplexing
 - c) Time slots Multiple access
 - d) None of these
- 5) Now, GSM stands for
 - a) Group special mobile
 - b) Global system for mobile communication
 - c) Global system for mobile
 - d) Option (a) and (b)
- 6) TMSI stands for
 - a) Temporary mobile subscriber identify
 - b) Transmission mobile signals interfaces
 - c) Time for multiple signals Interface
 - d) None of the above
- 7) PLCP stands for _____
 - a) Physical layer connection protocol
 - b) Primary Layer connection protocol
 - c) Physical layer convergence protocol
 - d) Physical layer communication protocol
- 8) Bluetooth operates on _____ channels in the 2.4 GHz band with 1 MHz carrier spacing
 - a) 20
 - b) 79
 - c) 80
 - d) 70

- 9) DHCP clients send a request to a server _____ which the server responds.
- a) DHCPDISCOVER
 - b) DHCPRECIIVE
 - c) DHCPHOST
 - d) DHCPPOST
- 10)MANET stands for _____
- a) Mobile Access Network
 - b) Mobile ad-hoc networking
 - c) Movable Network
 - d) Mobile Application for network

B) State following statements are True or False 04

- 1) Manifest is the configuration file for the android application
- 2) A layout is view hierarchies that control screen format and appearance of the views.
- 3) In bin folder contain the Android package files .ask built by the ADT during the build process and everything.
- 4) res/layout is a directory for files that define android apps interface.

Q.2 A) Write short notes on the following 06

- a) Handover
- b) Android Debugging

B) Answer the following 08

- a) What is signal and Radio frequency?
- b) What is android and explain any two applications?

Q.3 Answer the following 14

- a) What are main benefits of spread spectrum system? How can spreading be achieved?
- b) What are different advantages and disadvantages of cellular systems with small cells?

Q.4 Answer the following 14

- a) Explain in detail Mobile Terminated Call (MTC) and Mobile Originated Call (MOC)
- b) How a Piconet and Scatternet is formed in Bluetooth?

Q.5 Answer the following. 14

- a) Draw the header format for IP-in-IP encapsulation and explain each field.
- b) What is mobile TCP? Describe the term: snooping TCP, I-TCP.

Q.6 Answer the following. 14

- a) What is Android? Explain the architecture and application of android.
- b) Explain android Bluetooth with suitable example?

Q.7 Answer the following. 14

- a) Write android MainActivity.xml and MainActivity.java that determine whether a person age is eligible for blood donor or not?
- b) What is multiplexing? Explain the different techniques.

| | |
|----------|--|
| Seat No. | |
|----------|--|

**M.Sc. (Semester - III) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
ARTIFICIAL INTELLIGENCE**

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) Discourse Integration is used to state the meaning of an individual sentence that may depend on the sentences that _____ it and may influence the meaning of the sentences that follow it.
 - a) Follow
 - b) Precede
 - c) Chase
 - d) None of these
- 2) Measure of disbelief measures the extent to which the evidence supports the _____ of the hypothesis.
 - a) Negation
 - b) Deletion
 - c) Insertion
 - d) Duplication
- 3) _____ script is appropriate to activate the script fully and to attempt to fill in its slot with particular objects and people involved in the current situation.
 - a) Fleeting
 - b) Non-fleeting
 - c) Both (a) and (b)
 - d) None of the above
- 4) _____ produces proofs by refutation.
 - a) Iterative deepening
 - b) Problem reduction
 - c) Resolution
 - d) System Shells
- 5) _____ maintains a network of rule conditions, and it uses changes in the state description to determine which new rules might apply.
 - a) RETE
 - b) SALT
 - c) TEIRESIAS
 - d) MYCIN
- 6) Robot control task belong to the domain of _____ task.
 - a) Formal
 - b) Expert
 - c) Mundane
 - d) Engineering
- 7) The predicate *instance* is a _____ one, whose first argument is an object and whose second argument is a class to which the object belongs.
 - a) Unary
 - b) Binary
 - c) Ternary
 - d) Quarter
- 8) The means-ends analysis process centers for the detection of difference between the current state and the _____ state.
 - a) Original
 - b) Goal
 - c) Start
 - d) Main
- 9) _____ search is good because it does not get trapped on dead-end paths.
 - a) Linear search
 - b) Breadth first search
 - c) Binary search
 - d) Depth first search

10)A _____ symbol system consist a set of entities, called symbols, which are _____ patterns that can occur as components of another type of entity called expression.

- a) Logical
- b) Imperial
- c) Physical
- d) Consistent

B) State following statements are True or False **04**

- 1) Well designed heuristic functions can play an important part in efficiently guiding a search process toward a solution.
- 2) We can search backward through the state space from the start state to a goal state.
- 3) Partially commutative, monotonic production systems can be implemented without the ability to backtrack to previous states when it is discovered that an incorrect path has been followed.
- 4) Using frames, information is represented as a set of nodes connected to each other by a set of labeled arcs, which represent relationship among the nodes.

Q.2 A) Write short notes on the following **08**

- a) Procedural versus Declarative knowledge
- b) Generate and Test

B) Answer the following **06**

- a) What do you mean by Predicate Logic?
- b) What do you mean by Reasoning?

Q.3 Answer the following **07**

- a) What do you mean by MYCIN? Discuss concept of explanation as effective tool of the expert system. **07**
- b) What do you mean by Strong Slot and filler structure? Explain in detail Conceptual dependency with suitable example? **07**

Q.4 Answer the following **07**

- a) List out additional refinements in Minmax procedure. Discuss in detail Alpha-Beta cutoff with suitable example? **07**
- b) What is Syntactic analysis? Explain in detail Syntactic processing using grammars and parser with suitable example? **07**

Q.5 Answer the following. **07**

- a) What do you mean by Natural Deduction? Discuss in detail Computable functions and predicate with suitable example. **07**
- b) What do you mean by Probability? Explain in detail Dempster-Shafer theory? **07**

Q.6 Answer the following. **07**

- a) Define the meaning of AI technique. Discuss in detail water-jug problem with suitable example. **07**
- b) Enlist and discuss in detail different key dimension of problem characteristics. **07**

Q.7 Answer the following. **07**

- a) Discuss in detail Frame as weak slot and filler structure with suitable example. **07**
- b) Discuss in detail Hill climbing and steepest ascent hill climbing as heuristics search strategies. **07**

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - III) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
WEB DESIGN TECHNIQUES

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) Which tag is used to display the numbered list?
 - a)
 - b) <DL></DL>
 - c)
 - d)
- 2) "Yahoo", "Infoseek" and "Lycos" are _____?
 - a) Search Engines
 - b) Browsers
 - c) News groups
 - d) None of the above
- 3) Which of the following jQuery method get the text contents of an element?
 - a) text()
 - b) getText()
 - c) getContent()
 - d) None of the above
- 4) <TITLE> ... </TITLE> tag must be within _____.
 - a) Title
 - b) Form
 - c) Header
 - d) Body
- 5) <SCRIPT> ... </SCRIPT> tag can be placed within _____.
 - a) Header
 - b) Body
 - c) Both A and B
 - d) None of the above
- 6) Which statement is true?
 - a) An XML document can have one root element
 - b) An XML document can have one child element
 - c) XML elements have to be in lowercase
 - d) All of the above
- 7) Which is true to change the text color to red?
 - a) <BODY BGCOLOR=RED>
 - b) <BODY TEXT=RED>
 - c) <BODY COLOR=RED>
 - d) None of the above
- 8) Which sign does jQuery use as a shortcut for jQuery?
 - a) the % sign
 - b) the ? Sign
 - c) the \$ sign
 - d) the * sign
- 9) Which jQuery method is used to set one or more style properties for selected elements?
 - a) css()
 - b) html()
 - c) style()
 - d) head ()
- 10) What is the correct way of describing XML data?
 - a) XML uses a DTD to describe data
 - b) XML uses a description node to describe data
 - c) XML uses XSL to describe the data
 - d) XML uses a validator to describe the data

- B) State following statements are True or False** **04**
- 1) It is possible to use jQuery together with AJAX.
 - 2) CSS is acronym for Cascading System Sheet.
 - 3) Prev() jQuery method adds the previous selection to the current selection.
 - 4) The World Wide Web Consortium is making the Web standards.

- Q.2 A) Write short notes on the following** **08**
- a) Ajax Events
 - b) DOM

- B) Answer the following** **06**
- a) Explain DTD with example.
 - b) What is jQuery? Explain the features of jQuery.

- Q.3 Answer the following** **14**
- a) Explain the following HTML tags with attributes:
 - 1) <head>
 - 2) <html>
 - 3)
 - 4) <table>
 - b) What is function? Explain how parameters are passed to functions in JavaScript.

- Q.4 Answer the following** **14**
- a) Explain CDATA in XML with example
 - b) What is cascading style sheet? Explain types of CSS with examples

- Q.5 Answer the following.** **14**
- a) Write an HTML source to display the following table

| Roll No | Student Name | Subjects | | | Total Marks |
|---------|--------------|----------|-----------------|------|-------------|
| | | Java | WEB DEVELOPMENT | C ++ | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

- b) What is the use of HTML form? Create a HTML page for login details.

- Q.6 Answer the following.** **14**
- a) Develop a JavaScript program to display a message:
 - 1) “Wel come” – When page is loaded and
 - 2) “THANK YOU visit again” – When page is unloaded
 - b) Using Frames divide the web pages as follows:

| | | | |
|--|--|--|--|
| | | | |
| | | | |

Q.7 Answer the following.

- a) Explain AJAX with example
- b) Write and explain tags to create following HTML elements with their attributes:
 - 1) Textbox
 - 2) Drop-down list
 - 3) Password field
 - 4) Checkbox
 - 5) Radio button

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
.NET TECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) What is the value of double constant 'E' defined in Math class?
 - a) Approximately 3
 - b) Approximately 3.14
 - c) Approximately 2.72
 - d) Approximately 0
- 2) Which of these is a method used to clear all the data present in output buffers?
 - a) clear()
 - b) flush()
 - c) fflush()
 - d) close()
- 3) Which of the following is used to perform all input & output operations in C#?
 - a) Streams
 - b) Variables
 - c) Classes
 - d) Methods
- 4) Which of the following is a type of stream in C#?
 - a) Integer stream
 - b) Character stream
 - c) Bytes stream
 - d) Long stream
- 5) Which of the following is not a namespace in the .NET Framework Class Library?
 - a) System.Process
 - b) System.Security
 - c) System.Threading
 - d) System.xml
- 6) Which of the following are parts of the .NET Framework?
 1. The common Language Runtime (CLR)
 2. The Framework Class Libraries (FCL)
 3. Microsoft Published Web services
 4. Applications deployed on IIS
 5. Mobile Applications
 - a) Only 1, 2, 3
 - b) Only 1, 2
 - c) Only 1, 2, 4
 - d) Only 4, 5
- 7) Which of these exceptions will occur if we try to access the index of an array beyond its length?
 - a) ArithmeticException
 - b) ArrayException
 - c) ArgumentException
 - d) IndexOutOfRangeException
- 8) Which of the following keywords is used by the calling function to guard against the exception that is thrown by called function?
 - a) Try
 - b) Throw
 - c) Throws
 - d) Catch

- 9) What is the use of try & catch?
- It is used to manually handle the exception
 - It helps to fix the errors
 - It prevents automatic terminating of the program in cases when an exception occurs
 - All of the mentioned
- 10) Which of the following is not a namespace in the .NET Framework Class Library?
- System.Process
 - System.Security
 - System.Threading
 - System.xml

B) State following statements are True or False. 04

- Boolean is the data type return in IsPostBack property.
- Load is first method that is fired during the page load.
- All comparison operators return Integer type value.
- Text is a property common to every validation control.

Q.2 A) Write short notes on the following. 08

- Exception Handling
- ASP.NET life cycle.

B) Answer the following. 06

- Explain Button and Textbox control with example.
- What is Delegate? Explain the properties of Delegate.

Q.3 Answer the following. 14

- What is State management? Explain Cookies in ASP.NET?
- What is Validation? Explain Compare Validator, RegularExpressionValidator.

Q.4 Answer the following. 14

- What is preprocessor? Describe different preprocessors in C#.
- Differentiate in between ASP and ASP.NET.

Q.5 Answer the following. 14

- What is master page? Write stepwise process of creating master page.
- What is inheritance? Explain with example.

Q.6 Answer the following. 14

- Explain components of .NET framework.
- Explain ASP.NET page events and attributes of page directives with example.

Q.7 Answer the following. 14

- What is namespace? Explain how to create namespace with example
- Design a windows application and write code to inserts a student record.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
SOFT COMPUTING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) A perceptron is :
 - a) A single layer feed-forward neural network with pre-processing
 - b) An auto-associative neural network
 - c) A double layer auto-associative neural network
 - d) A neural network that contains feedback
- 2) When input for a neuron is zero and the transfer function used in Unipolar sigmoidal, what is the output?
 - a) 0
 - b) 0.5
 - c) 1
 - d) Infinity
- 3) Interval valued fuzzy set is a type of fuzzy sets whose membership function is _____ in [0, 1]
 - a) Multiple real numbers
 - b) A closed interval of real number
 - c) Multiple closed overlapping intervals of real number
 - d) Multiple closed non-overlapping intervals of real number
- 4) 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) $(\phi, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\})$
- 5) Which of the following is/are true?
 - i) ${}^{\alpha}(\bar{A}) = \bar{{}^{\alpha}A}$
 - ii) ${}^{\alpha+}(\bar{A}) = \bar{{}^{\alpha+}A}$
 - a) (i)
 - b) (ii)
 - c) (i) and (ii)
 - d) None
- 6) The *height* of a fuzzy set is _____
 - a) Largest α -cut of set members
 - b) Largest strong α -cut of set members
 - c) Largest membership grade of set members
 - d) All the above
- 7) Let R be a binary relation between two fuzzy sets X and Y, given as :

$$R(X, Y) = \begin{bmatrix} .8 & .6 & .1 \\ .1 & .3 & .4 \\ 0 & .7 & .5 \end{bmatrix}$$
 Then $[.8 \ .4 \ .7]$ is _____ of R.
 - a) Range
 - b) Domain
 - c) Height
 - d) Standard composition

- 8) A binary relation $R(X, X)$ 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) Which of the following is not a traditional search and optimization methods?
 - a) Cellular automata
 - b) Genetic algorithms
 - c) Random cost
 - d) Queuing
- 10) Which of the following is not a low level genetic operator?
 - a) Reproduction
 - b) Mating
 - c) Translocation
 - d) Migration

B) Fill in the blanks 04

- 1) A neuron is composed of a nucleus (known as soma), attached to soma are long irregularly shaped filaments called _____
- 2) Let A be a fuzzy set defined on X , then $\bar{A}(x) = \underline{\hspace{2cm}}$ for all $x \in X$
- 3) A binary relation that is transitive and symmetric but not reflexive is known as _____ relation.
- 4) The encoding method used in ordering problems such as travelling salesman is _____

Q.2 A) Write short notes on the following. 08

- a) Characteristics of neural networks
- b) Rank selection method

B) Answer the following. 06

- a) For the following specifications of a fuzzy set A draw graph:
 - a) $A_i(2) = 1$ and $A_i(x) < 1$, for all $x \neq 2$;
 - b) A_i is symmetric with respect to $x = 2$, that is $A_i(2 + x) = A_i(2 - x)$ for all $x \in \mathbb{R}$;
 - c) $A_i(x)$ Decreases monotonically from 1 to 0 with the increasing difference $|2 - x|$
- b) Illustrate tree encoding with an example.

Q.3 Answer the following 14

- a) What are learning methods? Discuss.
- b) Draw the network architecture and compute output for the following two layer

neural network using Sigmoidal function with $\lambda = 1$, input = $\begin{bmatrix} -0.2 \\ 0.6 \\ 0.1 \end{bmatrix}$, hidden

$$\text{layer wts} = \begin{bmatrix} -0.1 & 0.9 \\ 0.2 & -0.6 \\ -0.3 & 0.5 \end{bmatrix}, \text{ output layer wts} = \begin{bmatrix} 0.8 & -0.1 \\ 0.4 & 0.2 \end{bmatrix}$$

Q.4 Answer the following 14

- a) What are the typical non-linear activation functions? Describe equation and functional form of any three.
- b) Compute the scalar cordiality and degree of subsethood of fuzzy sets defined by the following functions :

$$A(x) = \frac{x}{15} \text{ and } B(x) = \frac{x^2}{x^3+1} \text{ for } x \in \{0, 1, 2, \dots, 10\} = X$$

Q.5 Answer the following.

14

- a) Describe intervalled and type 2 fuzzy sets with suitable examples
- b) Find transitive max-min closure R_T for the following fuzzy relations $R(X, X)$ defined by the membership matrix :

$$\begin{bmatrix} 1 & .2 & 0 & 0 \\ 0 & 0 & .4 & .3 \\ 1 & .2 & 0 & 0 \\ 0 & 0 & .4 & .3 \end{bmatrix}$$

Q.6 Answer the following.

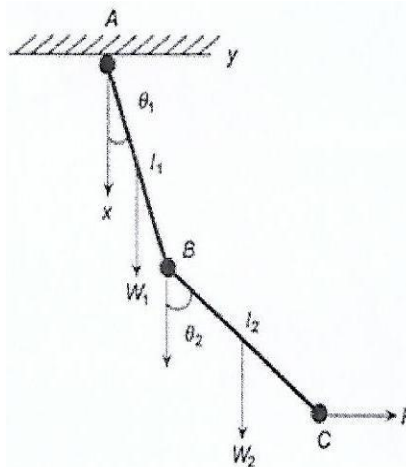
14

- a) Let a function $c : [0, 1] \rightarrow [0, 1,]$ satisfy boundary condition and monotonicity. Then prove that, c is continuous and involutive. Also prove that, c is a bijective function.
- b) For each of the following binary relations on a single set, state with suitable example whether the relation is reflexive, irreflexive or antireflexive, symmetric, asymmetric, antisymmetric or strictly antisymmetric, and transitive, nontransitive or antitransitive:
 - i) "is a parent of"
 - ii) "is smarter than"

Q.7 Answer the following.

14

- a) Discuss permutation and value encoding methods.
- 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 θ_1 and θ_2 are :

- 0000 0010
- 0011 0011
- 0100 0101
- 0101 1000
- 0110 1001
- 1000 1010
- 1010 1011
- 1101 1110

Compute fitness function given following parameters: $P = 2, W_1 = 2, W_2 = 1, l_1 = 5, l_2 = 1$. Also draw pie chart using rank selection method.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
DATA MINING AND WAREHOUSE

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.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 the correct alternative: 14

- 1) KDD described the _____
 - a) whole process of extraction of knowledge from data
 - b) extraction of data
 - c) extraction of information
 - d) extraction or rules
- 2) Translation of problem to learning technique is called as _____
 - a) reengineering
 - b) translational engineering
 - c) representational engineering
 - d) learning algorithm
- 3) The partition of overall data warehouse is _____
 - a) database
 - b) data cube
 - c) data mart
 - d) operational data
- 4) OLAP stands for _____
 - a) Online Analytical Processing
 - b) Online Linear Analytical Processing
 - c) Online Animated Process
 - d) Online Analytical Problem
- 5) K-nearest neighbor is one of the _____
 - a) learning technique
 - b) OLAP tool
 - c) purest search technique
 - d) data warehousing tool
- 6) SQL stands for _____
 - a) Simple query language
 - b) Structured query language
 - c) Strong query language
 - d) Simple language
- 7) Association rules are always defined on _____
 - a) binary attribute
 - b) single attribute
 - c) relational database
 - d) multidimensional attribute
- 8) _____ analysis divides data into groups that are meaningful, useful or both.
 - a) Cluster
 - b) Association
 - c) Classification
 - d) Relation
- 9) Which of the following is the not a types of clustering?
 - a) K-means
 - b) Hierarchical
 - c) Partitional
 - d) Splitting

- 10) The goal of data mining is _____
- a) to explain some observed event or condition
 - b) to confirm that data exists
 - c) to analyze data for expected relationships
 - d) to create a new data warehouse
- B) State true or false** **04**
- 1) Data cleaning is process of adding noise and inconsistent data.
 - 2) Information is collection of meaningful data.
 - 3) Data mining is used to extract the data patterns.
 - 4) Pattern recognition is not used to identify and classify the patterns.
- Q.2 A) Write Short notes on** **08**
- 1) Data mart
 - 2) Data reduction
- B) Answer the following** **06**
- 1) What is data cube? Explain snowflake schema model in short.
 - 2) What is noise? Explain binning method for smoothing the data
- Q.3 Answer the following**
- a) What is mean by data warehouse? Explain the difference between OLTP and OLAP. **07**
 - b) What is classification? Explain the issues regarding with classifications. **07**
- Q.4 Answer the following**
- a) Describe the functionalities of data mining **07**
 - b) How to generate association rules from frequent item sets? Explain. **07**
- Q.5 Answer the following**
- a) Describe the data ware house architecture with well labeled diagram. **07**
 - b) Explain various data mining primitives. **07**
- Q.6 Answer the following**
- a) Explain Agglomerative hierarchical clustering with example. **07**
 - b) Explain Apriori algorithm with example. **07**
- Q.7 Answer the following**
- a) Define Data Mining. Explain their need and applications with examples. **07**
 - b) Write an algorithm for k means for clustering. **07**

| | |
|-------------|--|
| Seat No. | |
|-------------|--|

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
DISTRIBUTED OPERATING SYSTEM

Time: 2½ Hours

Max. Marks: 70

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

Q.1 A) Choose correct alternative: 10

- 1) _____ need radically different software than centralized systems do.
 - a) Network Operating System
 - b) Operating Systems
 - c) Distributed Systems
 - d) None of these
- 2) If the system is _____, the users will not notice existence of other users.
 - a) Location transparent
 - b) Migration transparent
 - c) Parallelism transparent
 - d) Concurrency transparent
- 3) A _____ system is one that is prepared to communicate with any other _____ system by using formalized rules called protocols.
 - a) Closed and Open
 - b) Open and Closed
 - c) Open and Open
 - d) Closed and Closed
- 4) When a process calls _____ it specifies a destination and a buffer to _____ to that destination.
 - a) Receive
 - b) Send
 - c) Block
 - d) Non-Block
- 5) The sending of message from single sender to a single receiver is called _____.
 - a) Uni-casting
 - b) Multicasting
 - c) Broadcasting
 - d) None of these
- 6) The _____ property ensures that each transaction either happens completely, or not at all, and if it happens, it happens in a single indivisible, instantaneous action.
 - a) Atomicity
 - b) Consistent
 - c) Isolated
 - d) Durable
- 7) The _____ strategies allow better load balancing, they are more complex and have a major impact on system design.
 - a) Migratory
 - b) Unstable allocation
 - c) Non-migratory
 - d) None of these
- 8) The NIST stands for
 - a) National international Standard time
 - b) National Internet Standard time
 - c) National Institute of Standard Time
 - d) National Indian Standard Time
- 9) The _____ specifies the file system's interface to the clients.
 - a) File Control Block
 - b) File Service
 - c) File importer
 - d) File Server

- 10) _____ interface is a window system with a pointing device to direct I/O, choose menus and make selections and a keyboard to enter text.
- a) I/O
 - b) Batch
 - c) Command line
 - d) Graphical user

B) State True or False: 04

- 1) Device sharing allows user to share expensive peripherals like colour printers.
- 2) In loosely coupled system, the inter-machine message delay is short and data rate is high.
- 3) In OSI model, communication is divided up into seven levels or layers.
- 4) In closed group outsiders can send messages to the group as a whole.

Q.2 A) Write short notes on: 08

- 1) Two Phase Locking Protocol
- 2) Happens-Before Relation

B) Answer the following: 06

- 1) What do you mean by request-reply layer?
- 2) What do you mean by process?

Q.3 a) What do you mean by multi-computers? State and explain in detail advantages and disadvantages of Distributed OS? 07

b) Discuss in detail Token ring algorithm to achieve Mutual Exclusion in Distributed OS. 07

Q.4 a) What is mean by System Model? Discuss scheme of diskful and diskless workstation. 07

b) What do you mean by Deadlock? Discuss in detail centralized deadlock detection with suitable example. 07

Q.5 a) What do you mean by Thread? Explain in detail concept of thread usage. 07

b) Discuss in detail comparison of MS-Windows NT and Novel Netware. 07

Q.6 a) Define the term Operating System. Explain in detail principle of demand paging with suitable example? 07

c) What is meant by Distributed File System? Discuss in detail the aspects of file service interface. 07

Q.7 a) Discuss in detail concept of Remote Procedure Call with suitable example. 07

b) State and explain in detail various Election algorithms with suitable example. 07

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Computer Science
NETWORK SECURITY

Time: 2½ Hours

Max. Marks: 70

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

Q.1 A) Choose correct alternatives: 10

- 1) Which of the following is passive attack?
 - a) Masquerade
 - b) Replay
 - c) Denial of Service
 - d) Traffic Analysis
- 2) Which of the following attack is not a threat to the integrity of data?
 - a) Masquerade
 - b) Modification
 - c) Repudiation
 - d) Snooping
- 3) The conversion of ciphertext into plaintext is known as _____.
 - a) Encryption
 - b) Decryption
 - c) Cryptography
 - d) Cryptanalyst
- 4) Which of the following is a component of cryptography?
 - a) Ciphertext
 - b) Ciphers
 - c) Key
 - d) All of these
- 5) The _____ cipher can be categorized as a stream cipher.
 - a) Additive
 - b) Hill
 - c) Playfair
 - d) None of these
- 6) Which of the following service is based on the IDEA algorithm?
 - a) PGP
 - b) S/MIME
 - c) SET
 - d) SSL
- 7) RSA _____ be used for digital signatures.
 - a) Can
 - b) Can not
 - c) Must
 - d) Must not
- 8) In which year was X.509 first issued?
 - a) 1988
 - b) 1978
 - c) 1982
 - d) 1977
- 9) Which of the following are IPSec protocols?
 - a) PGP and S/MIME
 - b) Kerberos 4, Kerberos 5
 - c) AH and ESP
 - d) SSL and SET
- 10) The firewall should be situated _____.
 - a) Outside the network
 - b) Inside the network
 - c) Between the network and the outside the world
 - d) None of these

- B) State whether true or false:** **04**
- 1) The loss of integrity is the unauthorized disclosure of information.
 - 2) VPN stands for Virtual Personal Number.
 - 3) SHA-1 length is 128 bit.
 - 4) The block cipher processes the input elements continuously.
- Q.2 A) Write short notes on the following:** **08**
- 1) Audit Record
 - 2) Cryptanalysis
- B) Answer the following:** **06**
- 1) What is the purpose of the S-boxes in DES?
 - 2) Define threat and attack
- Q.3 Answer the following:** **14**
- a) What is the need of network security? Explain its goals.
 - b) Explain passive attacks and active attacks.
- Q.4 Answer the following:** **14**
- a) What is key management? Also explain the functions of key management.
 - b) What do you mean by modern block cipher? What are its components?
- Q.5 Answer the following:** **14**
- a) Explain the working principle of the Kerberos protocol.
 - b) Explain the X.509 authentication service and its certificates.
- Q.6 Answer the following:** **14**
- a) What do you mean by firewall? Describe its characteristics.
 - b) Explain any two approaches for intrusion detection.
- Q.7 Answer the following:** **14**
- a) Explain DES with its structure. Also Explain its function.
 - b) What is ElGamal encryption system? Explain its encryption and decryption processes.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
.NET TECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) What is the value of double constant 'E' defined in Math class?
 - a) Approximately 3
 - b) Approximately 3.14
 - c) Approximately 2.72
 - d) Approximately 0
- 2) Which of these is a method used to clear all the data present in output buffers?
 - a) clear()
 - b) flush()
 - c) fflush()
 - d) close()
- 3) Which of the following is used to perform all input & output operations in C#?
 - a) Streams
 - b) Variables
 - c) Classes
 - d) Methods
- 4) Which of the following is a type of stream in C#?
 - a) Integer stream
 - b) Character stream
 - c) Bytes stream
 - d) Long stream
- 5) Which of the following is not a namespace in the .NET Framework Class Library?
 - a) System.Process
 - b) System.Security
 - c) System.Threading
 - d) System.xml
- 6) Which of the following are parts of the .NET Framework?
 1. The common Language Runtime (CLR)
 2. The Framework Class Libraries (FCL)
 3. Microsoft Published Web services
 4. Applications deployed on IIS
 5. Mobile Applications
 - a) Only 1, 2, 3
 - b) Only 1, 2
 - c) Only 1, 2, 4
 - d) Only 4, 5
- 7) Which of these exceptions will occur if we try to access the index of an array beyond its length?
 - a) ArithmeticException
 - b) ArrayException
 - c) ArgumentException
 - d) IndexOutOfRangeException
- 8) Which of the following keywords is used by the calling function to guard against the exception that is thrown by called function?
 - a) Try
 - b) Throw
 - c) Throws
 - d) Catch

- 9) What is the use of try & catch?
- It is used to manually handle the exception
 - It helps to fix the errors
 - It prevents automatic terminating of the program in cases when an exception occurs
 - All of the mentioned
- 10) Which of the following is not a namespace in the .NET Framework Class Library?
- System.Process
 - System.Security
 - System.Threading
 - System.xml

B) State following statements are True or False. 04

- Boolean is the data type return in IsPostBack property.
- Load is first method that is fired during the page load.
- All comparison operators return Integer type value.
- Text is a property common to every validation control.

Q.2 A) Write short notes on the following. 08

- Exception Handling
- ASP.NET life cycle.

B) Answer the following. 06

- Explain Button and Textbox control with example.
- What is Delegate? Explain the properties of Delegate.

Q.3 Answer the following. 14

- What is State management? Explain Cookies in ASP.NET?
- What is Validation? Explain Compare Validator, RegularExpressionValidator.

Q.4 Answer the following. 14

- What is preprocessor? Describe different preprocessors in C#.
- Differentiate in between ASP and ASP.NET.

Q.5 Answer the following. 14

- What is master page? Write stepwise process of creating master page.
- What is inheritance? Explain with example.

Q.6 Answer the following. 14

- Explain components of .NET framework.
- Explain ASP.NET page events and attributes of page directives with example.

Q.7 Answer the following. 14

- What is namespace? Explain how to create namespace with example
- Design a windows application and write code to inserts a student record.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
SOFT COMPUTING

Time: 2½ Hours

Max. Marks: 70

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

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

- 1) A perceptron is :
 - a) A single layer feed-forward neural network with pre-processing
 - b) An auto-associative neural network
 - c) A double layer auto-associative neural network
 - d) A neural network that contains feedback
- 2) When input for a neuron is zero and the transfer function used in Unipolar sigmoidal, what is the output?
 - a) 0
 - b) 0.5
 - c) 1
 - d) Infinity
- 3) Interval valued fuzzy set is a type of fuzzy sets whose membership function is _____ in [0, 1]
 - a) Multiple real numbers
 - b) A closed interval of real number
 - c) Multiple closed overlapping intervals of real number
 - d) Multiple closed non-overlapping intervals of real number
- 4) 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) $(\phi, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\})$
- 5) Which of the following is/are true?
 - i) ${}^{\alpha}(\bar{A}) = \bar{{}^{\alpha}A}$
 - ii) ${}^{\alpha+}(\bar{A}) = \bar{{}^{\alpha+}A}$
 - a) (i)
 - b) (ii)
 - c) (i) and (ii)
 - d) None
- 6) The *height* of a fuzzy set is _____
 - a) Largest α -cut of set members
 - b) Largest strong α -cut of set members
 - c) Largest membership grade of set members
 - d) All the above
- 7) Let R be a binary relation between two fuzzy sets X and Y, given as :

$$R(X, Y) = \begin{bmatrix} .8 & .6 & .1 \\ .1 & .3 & .4 \\ 0 & .7 & .5 \end{bmatrix}$$
 Then $[.8 \ .4 \ .7]$ is _____ of R.
 - a) Range
 - b) Domain
 - c) Height
 - d) Standard composition

- 8) A binary relation $R(X, X)$ 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) Which of the following is not a traditional search and optimization methods?
- a) Cellular automata b) Genetic algorithms
c) Random cost d) Queuing
- 10) Which of the following is not a low level genetic operator?
- a) Reproduction b) Mating
c) Translocation d) Migration

B) Fill in the blanks**04**

- 1) A neuron is composed of a nucleus (known as soma), attached to soma are long irregularly shaped filaments called _____
- 2) Let A be a fuzzy set defined on X , then $\bar{A}(x) = \underline{\quad}$ for all $x \in X$
- 3) A binary relation that is transitive and symmetric but not reflexive is known as _____ relation.
- 4) The encoding method used in ordering problems such as travelling salesman is _____

Q.2 A) Write short notes on the following.**08**

- a) Characteristics of neural networks
- b) Rank selection method

B) Answer the following.**06**

- a) For the following specifications of a fuzzy set A draw graph:
 - a) $A_i(2) = 1$ and $A_i(x) < 1$, for all $x \neq 2$;
 - b) A_i is symmetric with respect to $x = 2$, that is $A_i(2 + x) = A_i(2 - x)$ for all $x \in \mathbb{R}$;
 - c) $A_i(x)$ Decreases monotonically from 1 to 0 with the increasing difference $|2 - x|$
- b) Illustrate tree encoding with an example.

Q.3 Answer the following**14**

- a) What are learning methods? Discuss.
- b) Draw the network architecture and compute output for the following two layer

neural network using Sigmoidal function with $\lambda = 1$, input = $\begin{bmatrix} -0.2 \\ 0.6 \\ 0.1 \end{bmatrix}$, hidden

$$\text{layer wts} = \begin{bmatrix} -0.1 & 0.9 \\ 0.2 & -0.6 \\ -0.3 & 0.5 \end{bmatrix}, \text{ output layer wts} = \begin{bmatrix} 0.8 & -0.1 \\ 0.4 & 0.2 \end{bmatrix}$$

Q.4 Answer the following**14**

- a) What are the typical non-linear activation functions? Describe equation and functional form of any three.
- b) Compute the scalar cordiality and degree of subsethood of fuzzy sets defined by the following functions :

$$A(x) = \frac{x}{15} \text{ and } B(x) = \frac{x^2}{x^3+1} \text{ for } x \in \{0, 1, 2, \dots, 10\} = X$$

Q.5 Answer the following.

14

- a) Describe intervalled and type 2 fuzzy sets with suitable examples
- b) Find transitive max-min closure R_T for the following fuzzy relations $R(X, X)$ defined by the membership matrix :

$$\begin{bmatrix} 1 & .2 & 0 & 0 \\ 0 & 0 & .4 & .3 \\ 1 & .2 & 0 & 0 \\ 0 & 0 & .4 & .3 \end{bmatrix}$$

Q.6 Answer the following.

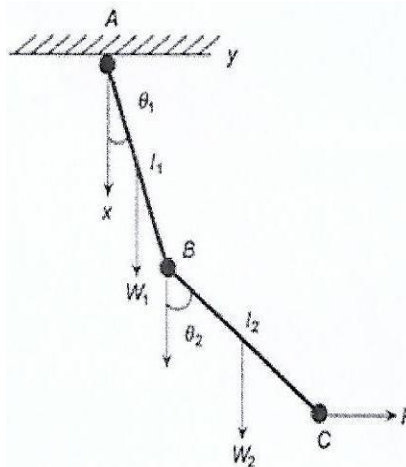
14

- a) Let a function $c : [0, 1] \rightarrow [0, 1,]$ satisfy boundary condition and monotonicity. Then prove that, c is continuous and involutive. Also prove that, c is a bijective function.
- b) For each of the following binary relations on a single set, state with suitable example whether the relation is reflexive, irreflexive or antireflexive, symmetric, asymmetric, antisymmetric or strictly antisymmetric, and transitive, nontransitive or antitransitive:
 - i) "is a parent of"
 - ii) "is smarter than"

Q.7 Answer the following.

14

- a) Discuss permutation and value encoding methods.
- 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 θ_1 and θ_2 are :

- 0000 0010
- 0011 0011
- 0100 0101
- 0101 1000
- 0110 1001
- 1000 1010
- 1010 1011
- 1101 1110

Compute fitness function given following parameters: $P = 2$, $W_1 = 2$, $W_2 = 1$, $l_1 = 5$, $l_2 = 1$. Also draw pie chart using rank selection method.

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
DATA MINING AND WAREHOUSE

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.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 the correct alternative: 14

- 1) KDD described the _____
 - a) whole process of extraction of knowledge from data
 - b) extraction of data
 - c) extraction of information
 - d) extraction or rules
- 2) Translation of problem to learning technique is called as _____
 - a) reengineering
 - b) translational engineering
 - c) representational engineering
 - d) learning algorithm
- 3) The partition of overall data warehouse is _____
 - a) database
 - b) data cube
 - c) data mart
 - d) operational data
- 4) OLAP stands for _____
 - a) Online Analytical Processing
 - b) Online Linear Analytical Processing
 - c) Online Animated Process
 - d) Online Analytical Problem
- 5) K-nearest neighbor is one of the _____
 - a) learning technique
 - b) OLAP tool
 - c) purest search technique
 - d) data warehousing tool
- 6) SQL stands for _____
 - a) Simple query language
 - b) Structured query language
 - c) Strong query language
 - d) Simple language
- 7) Association rules are always defined on _____
 - a) binary attribute
 - b) single attribute
 - c) relational database
 - d) multidimensional attribute
- 8) _____ analysis divides data into groups that are meaningful, useful or both.
 - a) Cluster
 - b) Association
 - c) Classification
 - d) Relation
- 9) Which of the following is the not a types of clustering?
 - a) K-means
 - b) Hierarchical
 - c) Partitional
 - d) Splitting

| | | |
|------------|--|-----------|
| | 10) The goal of data mining is _____ | |
| | a) to explain some observed event or condition | |
| | b) to confirm that data exists | |
| | c) to analyze data for expected relationships | |
| | d) to create a new data warehouse | |
| | B) State true or false | 04 |
| | 1) Data cleaning is process of adding noise and inconsistent data. | |
| | 2) Information is collection of meaningful data. | |
| | 3) Data mining is used to extract the data patterns. | |
| | 4) Pattern recognition is not used to identify and classify the patterns. | |
| Q.2 | A) Write Short notes on | 08 |
| | 1) Data mart | |
| | 2) Data reduction | |
| | B) Answer the following | 06 |
| | 1) What is data cube? Explain snowflake schema model in short. | |
| | 2) What is noise? Explain binning method for smoothing the data | |
| Q.3 | Answer the following | |
| | a) What is mean by data warehouse? Explain the difference between OLTP and OLAP. | 07 |
| | b) What is classification? Explain the issues regarding with classifications. | 07 |
| Q.4 | Answer the following | |
| | a) Describe the functionalities of data mining | 07 |
| | b) How to generate association rules from frequent item sets? Explain. | 07 |
| Q.5 | Answer the following | |
| | a) Describe the data ware house architecture with well labeled diagram. | 07 |
| | b) Explain various data mining primitives. | 07 |
| Q.6 | Answer the following | |
| | a) Explain Agglomerative hierarchical clustering with example. | 07 |
| | b) Explain Apriori algorithm with example. | 07 |
| Q.7 | Answer the following | |
| | a) Define Data Mining. Explain their need and applications with examples. | 07 |
| | b) Write an algorithm for k means for clustering. | 07 |

| | |
|----------|--|
| Seat No. | |
|----------|--|

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Computer Science
DISTRIBUTED OPERATING SYSTEM

Time: 2½ Hours

Max. Marks: 70

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

Q.1 A) Choose correct alternative: 10

- 1) _____ need radically different software than centralized systems do.
 - a) Network Operating System
 - b) Operating Systems
 - c) Distributed Systems
 - d) None of these
- 2) If the system is _____, the users will not notice existence of other users.
 - a) Location transparent
 - b) Migration transparent
 - c) Parallelism transparent
 - d) Concurrency transparent
- 3) A _____ system is one that is prepared to communicate with any other _____ system by using formalized rules called protocols.
 - a) Closed and Open
 - b) Open and Closed
 - c) Open and Open
 - d) Closed and Closed
- 4) When a process calls _____ it specifies a destination and a buffer to _____ to that destination.
 - a) Receive
 - b) Send
 - c) Block
 - d) Non-Block
- 5) The sending of message from single sender to a single receiver is called _____.
 - a) Uni-casting
 - b) Multicasting
 - c) Broadcasting
 - d) None of these
- 6) The _____ property ensures that each transaction either happens completely, or not at all, and if it happens, it happens in a single indivisible, instantaneous action.
 - a) Atomicity
 - b) Consistent
 - c) Isolated
 - d) Durable
- 7) The _____ strategies allow better load balancing, they are more complex and have a major impact on system design.
 - a) Migratory
 - b) Unstable allocation
 - c) Non-migratory
 - d) None of these
- 8) The NIST stands for
 - a) National international Standard time
 - b) National Internet Standard time
 - c) National Institute of Standard Time
 - d) National Indian Standard Time
- 9) The _____ specifies the file system's interface to the clients.
 - a) File Control Block
 - b) File Service
 - c) File importer
 - d) File Server

- 10) _____ interface is a window system with a pointing device to direct I/O, choose menus and make selections and a keyboard to enter text.
- a) I/O
 - b) Batch
 - c) Command line
 - d) Graphical user

B) State True or False: 04

- 1) Device sharing allows user to share expensive peripherals like colour printers.
- 2) In loosely coupled system, the inter-machine message delay is short and data rate is high.
- 3) In OSI model, communication is divided up into seven levels or layers.
- 4) In closed group outsiders can send messages to the group as a whole.

Q.2 A) Write short notes on: 08

- 1) Two Phase Locking Protocol
- 2) Happens – Before Relation

B) Answer the following: 06

- 1) What do you mean by request-reply layer?
- 2) What do you mean by process?

Q.3 a) What do you mean by multi-computers? State and explain in detail advantages and disadvantages of Distributed OS? 07

b) Discuss in detail Token ring algorithm to achieve Mutual Exclusion in Distributed OS. 07

Q.4 a) What is mean by System Model? Discuss scheme of diskful and diskless workstation 07

b) What do you mean by Deadlock? Discuss in detail centralized deadlock detection with suitable example. 07

Q.5 a) What do you mean by Thread? Explain in detail concept of thread usage. 07

b) Discuss in detail comparison of MS-Windows NT and Novel Netware. 07

Q.6 a) Define the term Operating System. Explain in detail principle of demand paging with suitable example? 07

c) What is meant by Distributed File System? Discuss in detail the aspects of file service interface. 07

Q.7 a) Discuss in detail concept of Remote Procedure Call with suitable example 07

b) State and explain in detail various Election algorithms with suitable example. 07

Seat
No.

| |
|--|
| |
|--|

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Computer Science
NUMERICAL ANALYSIS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Question No.1 and 2 is compulsory.
 2) Attempt any three questions from Question No.3 and Question No.7
 3) Figures to the right indicate full marks.
 4) Use of calculator is allowed.

Q.1 A) Fill in the blanks:- (one mark each) 10

- 1) The Newton Raphson method when $f'(x)$ is _____.
- 2) The error in Simpson's 1/3 rule over $[x_0x_2]$ is _____.
- 3) Power method is used to find _____.
- 4) The value of y at $x = 0.02$ in solving $y' = -y$ by Euler method with the condition $y(0) = 1$ and $h = 0.01$ is _____.
- 5) Simpsons 3/8 rule for integration gives exact result when $f(x)$ is a polynomial of degree _____.
- 6) n^{th} order finite difference of n^{th} order polynomial is _____.
- 7) An approximate value of π is $x_1 = 3.1428571$ and its true value is $x = 3.1415926$, then the absolute error E_A is _____.
- 8) Lagrange's interpolating polynomial is _____.
- 9) Householders method is used to obtain eigenvalues of _____ matrices.
- 10) Newton Raphson method converges _____.

Q.1 B) Choose the correct alternative:- (one mark each) 04

- 1) The backward difference operator is _____.
 - a) $\nabla f(x_i) = f(x_i + h) - f(x_i)$
 - b) $\nabla f(x_i) = f(x_i) - f(x_i - h)$
 - c) $\nabla f(x_i) = f(x_i - h) - f(x_i)$
 - d) $\nabla f(x_i) = f(x_i) + f(x_i - h)$
- 2) If $f(0) = 1, f(1) = 3$ and $f(3) = 55$ then the Lagrange fundamental polynomial is _____.
 - a) $(1/3)(x^2 - 4x + 3)$
 - b) $x^2 - 4x - 3$
 - c) $(1/2)(3x - x^2)$
 - d) $(1/6)(x^2 - x)$
- 3) The relation between ∇ and E is given _____.
 - a) $E = (1 - \nabla)^{-1}$
 - b) $E = (1 + \nabla)^{-1}$
 - c) $\nabla = (1 + E)^{-1}$
 - d) $\nabla = (E - 1)$
- 4) In Gauss elimination method the coefficient matrix is reduced to _____.
 - a) Diagonal matrix
 - b) Zero matrix
 - c) Upper triangular matrix
 - d) None of these

Q.2 a) Find the area bounded by the curve and the x-axis from $x = 7.47$ to $x = 7.52$ using following table 04

| | | | | | | |
|------|------|------|------|------|------|------|
| X | 7.47 | 7.48 | 7.49 | 7.50 | 7.51 | 7.52 |
| F(x) | 1.93 | 1.95 | 1.98 | 2.01 | 2.03 | 2.06 |

- b) Prove that $\Delta^n u_{x-n} = u_x - nu_{x-1} + \frac{n(n-1)}{2}u_{x-2} + \dots + (-1)^n u_{x-n}$ 03
- c) Find the cubic polynomial for the values $y(1) = 24, y(3) = 120, y(5) = 336$ and $y(7) = 720$ 03
- d) Find the root of equation $x^3 - 2x - 5 = 0$ using Newton Rashson method. 04

- Q.3** a) Derive Newton's backward difference interpolation formula. **07**
 b) Using the Householders transformation reduces the matrix $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ into **07**
 tridiagonal matrix.
- Q.4** a) Find real root of $x^2 - x - 1 = 0$ using bisection method. **07**
 b) Solve $I = \int_0^1 \frac{1}{1+x} dx$ correct to three decimal places by Simpsons 1/3 rule **07**
 with $h = 0.125$
- Q.5** a) Find a positive root between 0 and 1 of the equation $xe^x = 1$ using iteration **07**
 method
 b) Solve the equation $x_1 + x_2 + x_3 = 1, 4x_1 + 3x_2 - x_3 = 6, 3x_1 + 5x_2 + 3x_3 = 4$ **07**
 using LU decomposition method.
- Q.6** a) Derive Lagrange interpolating formula. **07**
 b) Using divided differences, find $f(x)$ as polynomial in x from the following data **07**
- | | | | | | |
|------|----|----|----|-----|------|
| X | -1 | 0 | 3 | 6 | 7 |
| F(x) | 3 | -6 | 39 | 822 | 1611 |
- Q.7** a) Solve the system of equation $2x_1 - x_2 + 0x_3 = 1, -1x_1 + 2x_2 - x_3 = 1,$ **07**
 $0x_1 - x_2 + 2x_3 = 1$ using Gauss Seidel method.
 b) Use Secant method to determine the root of the equation $\cos x - xe^x = 0$ **07**

| | |
|----------|--|
| Seat No. | |
|----------|--|

Set **P**

M.Sc. (Semester - II) (Old) (Non CGPA) Examination Mar/Apr-2018
Computer Science
NUMERICAL MATHEMATICS

Time: 2½ Hours

Max. Marks: 70

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

Q.1 a) Fill in the blanks: (One mark each) 07

- 1) In lagrange basis polynomial $l_i(x_j) = \underline{\hspace{2cm}}$ for $i = j$.
- 2) $\Delta f(x) = \underline{\hspace{2cm}}$
- 3) $y_{i+1} = y_i + hf(x_i, y_i)$ this formula is known as $\underline{\hspace{2cm}}$ formula.
- 4) Rate of convergence of Newton- Raphson method is $\underline{\hspace{2cm}}$.
- 5) A non- algebraic equation is called $\underline{\hspace{2cm}}$ equation.
- 6) If primal problem has unbounded solution then dual problem has $\underline{\hspace{2cm}}$.
- 7) The number 35.7812 express in floating point number $\underline{\hspace{2cm}}$.

b) State true or false: (one mark each): 07

- 1) Lagrange interpolating polynomial is unique.
- 2) Rate of convergence of secant method is one.
- 3) If $f(x)$ is real and continuous in the interval $a < x < b$ and $f(a)$ & $f(b)$ are opposite sign then there is at most one real root in the interval a and b .
- 4) Primal & dual problem may be infeasible.
- 5) If primal problem have finite optimum solution then dual problem also finite optimum solution.
- 6) Modified Euler method is called midpoint method.
- 7) In iteration method diagonally dominant is necessary condition but not sufficient condition for convergence.

- Q.2 a) Write errors in Simpson's 1/3 and Trapezoidal rule.**
b) Find the Lagrange's interpolation polynomial of the pairs of points (-1,1), (0,1) and (1,3).
c) Convert the numbers to floating point notation.
 1) 0.00596 2) 65.7452 3) - 486.8
d) Using Taylor's expansion, derive a formula for computing second derivative of function.

Q.3 a) Find polynomial $f(x)$ by using Lagranges interpolation formula of given table

| | | | | |
|--------|------|---|----|----|
| x | 0 | 1 | 3 | 4 |
| $f(x)$ | - 12 | 0 | 12 | 24 |

b) Derive Newton's forward difference interpolation formula.

- Q.4 a) Solve the problem by simplex method,**
 Max $z = 3x_1 + 2x_2 + 5x_3$, subject to the constraints:
 $x_1 + 2x_2 + x_3 \leq 430$, $3x_1 + 2x_3 \leq 460$, $x_1 + 4x_2 \leq 420$ and $x_1, x_2, x_3 \geq 0$
b) Find the root of equation $x^2 - 4x - 10 = 0$ using bisection method.

- Q.5 a)** Obtain the solution of following system using the Jacobi iteration method

$$2x_1 + x_2 + x_3 = 5$$

$$3x_1 + 5x_2 + 2x_3 = 15$$

$$2x_1 + x_2 + 4x_3 = 8$$

- b)** Estimate the integral by trapezoidal method with $n=8$ of

$$\int_1^3 \frac{dx}{x}$$

- Q.6 a)** Given the equation $\frac{dy}{dx} = 3x^2 + 1$ with $y(1) = 2$. Estimate $y(2)$ by Euler method using $h = 0.25$.

- b)** Solve the system of equation using Gauss elimination method.

$$3x_1 + 6x_2 + x_3 = 16$$

$$2x_1 + 4x_2 + 3x_3 = 13$$

$$x_1 + 3x_2 + 2x_3 = 9$$

- Q.7 a)** Show that rate of convergence of Newton - Raphson method is quadratic.

- b)** Solve the system

$$3x_1 + 2x_2 + x_3 = 10$$

$$2x_1 + 3x_2 + 2x_3 = 14$$

$$x_1 + 2x_2 + 3x_3 = 14$$

by using Doolittle LU decomposition method