SLR-CK – 11

Seat No.	

M.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE
UML (Paper – VII)

Day and Date : Thursday, 20-11-2014 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

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

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

1) The UML is a language for _____ the artifacts of a software-intensive system.

a) Visualizing b) Documenting

c) Both a) and b) d) None of the above

2) Structural things are the _____ of UML models.

a) Nouns b) Syntax c) Pronouns d) Verbs

3) Certain elements are hidden to simplify the view is known as _____

a) Elided b) Incomplete

c) Execution d) Integrity

4) The _____ of a system encompasses the classes, interfaces, and collaborations that form the vocabulary of the problem and its solution.

a) Design view b) Process view

c) Use case view d) Implementation view

5) Class diagrams are grouped under _____

a) Structural modeling b) Behavioral modeling

c) Annotational modeling d) Process modeling

P.T.O.

6) _____ organizes the behaviors of the system.

a) Class diagram b) Use case diagram

c) Activity diagram d) Interaction diagrams

7) An _____ is ongoing non atomic execution within state-machine.

a) Activity b) Entity

c) Process d) None of these

8) A collection of operations that are used to specify a service of a class or a component is known as _____

a) Signal b) Node c) Interface d) Component

9) _____ specifies that the source instantiates the target template using the given actual parameters.

a) Derive b) Bind c) Friend d) None of these

10) Which of the following is the extensibility mechanism in the UML ?

a) Stereotype b) Tagged value

c) Constraints d) All the above

B) State **True** or **False** : **4**

1) Stub specifies a package that serves as a proxy for the public contents of another package.

2) Any sequence need not have a beginning.

3) A use case may have variants.

4) An event is the specification of a significant occurrence that has a location in time and space.

2. A) Write short notes on the following : **8**

i) Generalization Relationship in UML.

ii) Advanced Classes in UML.

B) Write difference between following : **6**

i) Sequence diagram and collaboration diagram.

ii) Simple class and active class.

3. Answer the following : **14**
   1) Building Blocks of UML.
   2) Explain Interfaces in UML.

4. Answer the following : **14**
   1) Explain Class Diagram in UML.
   2) Explain Events and Signals.

5. Answer the following : **14**
   1) Explain different types of objects used in component Diagram.
   2) Explain the Fork, Merge, Branch and Join from Activity Diagram in UML.

6. Answer the following : **14**
   1) Which are the Structural diagrams in UML ? Explain any one of them.
   2) Draw use case diagram for Online Shopping System.

7. Explain the following terms : **14**
   1) Process and Threads.
   2) State Machine.

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SLR-CK – 12

Seat No.	

M.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE
DBMS (Paper – VIII)

Day and Date : Saturday, 22-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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.*

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

1) _____ is a collection of interrelated data and a set of programs to access those data.

a) Program b) DBMS

c) File d) None of these

2) The collection of information stored in the database at a particular moment is called _____ of the database.

a) Instance b) Schema

c) Subschema d) None of these

3) A _____ is an association among several entities.

a) Attributes b) Entity

c) Relationship d) Association

4) Data about data is called _____

a) Attribute b) Entity

c) Relation d) Metadata

5) In database system _____ subsystem compiles and executes DDL and DML statements.

a) Transaction manager b) Query processor

c) Storage manager d) Buffer manager

P.T.O.

6) The set of permitted values for an attribute is called _____
   a) Field value b) Tuple
   c) Domain d) None of these
7) DCL stands for _____
   a) Data Control Language b) Domain Control Language
   c) Disk Control Language d) Data Compression Language
8) In SQL the _____ statement is used to confer authorization.
   a) Update b) Revoke
   c) Grant d) Administration
9) We say that a relation schema R is in _____ if the domains of all attributes of R are atomic.
   a) 2 NF b) 3 NF
   c) 1 NF d) 4 NF
10) ACID stands for _____
   a) Atomicity, Constraint, Isolation, Durability
   b) Atomicity, Constraint, Integrity, Durability
   c) Atomicity, Consistency, Integrity, Durability
   d) Atomicity, Consistency, Isolation, Durability

B) Fill in the blanks : **4**

1) _____ function returns the smallest integer greater than or equal to n.
2) In SELECT command _____ clause is used for getting rows from query in specific order.
3) In SQL _____ operator is used to compare multiple values.
4) _____ execution of transactions guarantees that consistency is preserved.

2. A) Write short notes on the following : **8**

i) DBA
ii) Integrity rules.

B) Answer the following : **6**

i) What problems are caused by data redundancies ? Can data redundancies be completely eliminated when the database approach is used ?
ii) What do you mean by function dependency ? Explain with example.

3. Answer the following :
   a) Explain the architecture of DBMS. **8**
   b) Define various types of keys with example. **6**

4. Answer the following :
   a) What is normalization ? Explain 3NF with example. **8**
   b) Explain multivalued functional dependency with suitable example. **6**

5. Answer the following :
   a) What are the fundamental operations in relational algebra ? Explain with suitable example. **7**
   b) What are different symbols used in E-R diagram ? **7**

6. Answer the following :
   a) Consider the relations : **8**

      SalesPerson(Sno, Name, Salary)

      Order(OrdNo. Sno. CustName, Amount)

      Customer(CustName, City)

      Write SQL commands for following queries :

      i) Find name and salary of all sales persons.

      ii) Names of sales persons who booked an order of at least Rs. 10,000/-

      iii) Names of customers living in city “A” and ordered for at least Rs. 20/-

      iv) Find total number of orders booked by customer “Sachin”.

   b) Explain the differences between standalone database and distributed database. **6**

7. Answer the following :
   a) Explain view serializability and conflict serializability. **6**
   b) Describe nested tables and varying arrays. **8**

SLR-CK – 13

Seat No.	

M.Sc. – II (Semester – III) Examination, 2014
COMPUTER SCIENCE
Paper – IX : Java Programming

Day and Date : Friday, 14-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***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.*

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

I) Which of the following statements about the Java language is true ?

A) Java supports only procedural approach towards programming

B) Both Procedural and Object Oriented Programming are supported in Java

C) Java supports only Object Oriented Programming approach

D) None of the above

II) Which is not a valid keyword in java ?

A) Null B) Transient

C) Synchronized D) Native

III) A collection of methods with no implementation is called an _____

A) Polymorphism B) Inheritance

C) Interface D) Data Binding

IV) If you access an uninitialized local variable will result

A) Syntax Error B) Compile Time Error

C) Run Time Error D) No Error

V) Which is right way to creating an array of integer ?

A) javaArray = new int[10];

B) javaArray new = myArray[10];

C) int[ ] javaArray = new int[10];

D) A) and C) both

P.T.O.

VI) Which keyword is used to inherit class ?

A) inherit B) extends C) inheritance D) extend

VII) Program which executes applet is known as

A) applet engine B) virtual machine

C) JVM D) None of above

VIII) What will be the output of the program ?

```
class MyClass
{
  int i;
  float j;
  public static void main(String[ ] args)
  {
    System.out.println("i = " + i +"j =" + j);
  }
}
```

A) i = 0 j = 0.0 B) i = 0 j = 0.000000

C) Compile Time Error D) None of the above

IX) Overloaded methods are differentiated by

A) Number of arguments

B) Data type of arguments

C) Number and the data type of the arguments

D) None of the above

X) Package of drawstring( ) method is

A) java.applet B) java.io

C) javax.swing D) java.awt

B) State **true/false** : **4**

i) JVM is platform dependent.

ii) The modifiers public and static cannot written in either order “public static” or “static public”.

iii) Interfaces can be instantiated.

iv) Assignment operator is evaluated Left to Right.

2. A) Write short notes on the following : **8**

   i) throw and throws.

   ii) break, continue and return.

   B) Answer the following : **6**

   i) Discuss various primitive data types supported by java.

   ii) Explain why java is considered as the best language for internet applications.

3. Answer the following : **14**

   A) What do you stand by multithread programming ? Explain with a simple suitable example.

   B) Write a program in java to create first 100 Fibonacci numbers.

4. Answer the following : **14**

   A) What are adaptor classes ?

   B) WAP to copy contents of one file to another file using FileInputStream and FileOutputStream classes.

5. Answer the following : **14**

   A) Assume that there is a table named as student in MS-Access with the following fields : Std_Rollno, name, course, ph_no. Write a java program to insert and then display the records of the table using JDBC.

   B) What are different ways to create threads ? Explain with examples.

6. Answer the following : **14**

   A) Define package. Explain how to create user defined packages in java.

   B) Explain about abstract classes and abstract methods.

7. Answer the following : **14**

   A) Explain life cycle of applet. Write a program to display image on Applet.

   B) Explain keyword super and this with a program.

SLR-CK – 14

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
COMPUTER SCIENCE
Paper – X : Artificial Intelligence

Day and Date : Monday, 17-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

1) A _____ has the necessary and sufficient means for general intelligent action.

a) Psychological Symbol System
b) Natural Language Symbol System
c) Physical Symbol System
d) None of these

2) The _____ is a knowledge acquisition system for heuristic classification problem.

a) SALT b) MOLE
c) MYCIN d) DENDRAL

3) A _____ is a process that converts a flat input sentence into hierarchical structure that corresponds to the units of meaning in the sentence.

a) Syntactic Processing b) Case Grammar
c) Fuzzy Logic d) Unification Grammars

4) The primitive act _____ stands for transfer of the abstract relationship.

a) PTRANS b) MTRANS
c) MBUILD d) ATRANS

P.T.O.

5) The _____ operated by matching the left sides of the rules against the user's last sentence and using the appropriate right side to generate a response.

a) Pragmatics system
b) Non-monotonic system
c) ELIZA system
d) Syntactic analysis

6) A measure of Belief measures the extent to which the _____ supports the hypothesis.

a) Fuzzy logic
b) Evidence
c) Hypothesis
d) Certainty

7) A predicate form of sentence – "All literate, who are not illiterate are well-educated" can be represented as

a) $\forall_x : \neg$literate(x) $\square$ illiterate (x) $\rightarrow$ educated(x)

b) $\forall_x$: illiterate(x)$\square\neg$ literate (x) $\rightarrow$ educated(x)

c) $\neg$ literate (x)$\square\neg$ illiterate(x) $\rightarrow$ $\neg$educated(x)

d) $\forall_x$: literate (x)$\square\neg$illiterate(x) $\rightarrow$ educated(x)

8) A most commonly used procedure is _____ , which exploits a proof by contradiction strategy.

a) Procedural knowledge
b) Resolution
c) Computable functions
d) Bayes theorem

9) A most useful form of inference is _____ , in which elements of specific classes inherit attributes and values from more general classes in which they are included.

a) Inferential efficiency
b) Procedural inheritance
c) Property inheritance
d) None of these

10) To build a system to solve a particular problem, there is a need to do _____ and represent the task knowledge that is necessary to solve the problem.

a) Define the problem
b) Analyze the problem
c) Search
d) Isolate

B) State **True** or **False** : **4**

1) **$P(H_i \backslash E)$** is the probability we will observe evidence *E* given that hypothesis *i* is true.

2) Mundane tasks include task related to Games, Mathematics.

3) In monotonic production system, the application of a rule never prevents the later application of another rule that could also have been applied at the first rule was selected.

4) To continue the search until no such drastic change occurs from one level to the next is called as waiting for quiescence.

2. A) Write a short note : **8**

1) Constraint Satisfaction

2) Semantic Net.

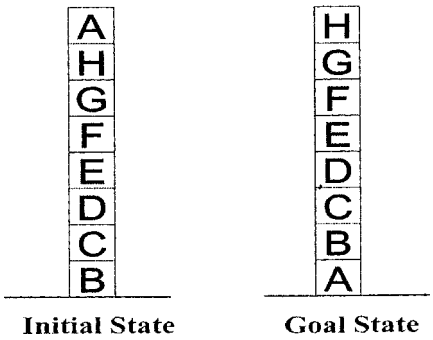
B) Answer the following : **6**

1) What do you mean by Frames ?

2) State in brief Fuzzy Logic.

3. Answer the following :

A) What do you mean by Heuristic ? Discuss Blocks word problem as shown in figure using Local and Global heuristic function. **7**



Initial State Goal State

B) Define Expert Systems. Explain in detail Expert System Shell and capabilities needed as part of Explanation. **7**

4. Answer the following :

   A) Define Reasoning. Describe in detail various Matching strategy. **7**

   B) Define Script. Write a Computer Laboratory script with a story : **7**

   "Sushant went to Computer Lab. He Turn on Computer. He started application to draft JAVA program. He compiles program with no errors. He went to Professor to note down the assignment."

5. Answer the following :

   A) State and discuss in detail key dimensions of Problem Characteristics. **7**

   B) Define Artificial Intelligence. Discuss in detail various approaches to knowledge representation. **7**

6. Answer the following :

   A) Discuss in detail steps involved to convert well formed formulas to Conjunctive Normal Form with suitable example. **7**

   B) What do you mean by Natural Language Processing ? Discuss and differentiate the steps in Natural Language Processing. **7**

7. Answer the following :

   A) Discuss in detail the Water Jug Problem with 5-gallon and 7-gallon jug; neither has any markers on it. How to get exactly 1 gallon of water into 7-gallon jug ? **7**

   B) Discuss in detail the procedure of MINMAX search in Game Playing. **7**

SLR-CK – 15

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
COMPUTER SCIENCE
Mobile Computing (Paper – XI)

Day and Date : Wednesday, 19-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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.*

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

i) Several antennas can be combined on single pole to construct
   a) Clustered Cell b) Clustered Antenna
   c) Sectorized Antenna d) Antenna Group

ii) _____ is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link.
   a) Demodulating b) Multiplexing
   c) Compressing d) None of the above

iii) The systems were "cellular" because coverage areas were split into _____ each of which is served by a low power transmitter and receiver.
   a) cells b) channels
   c) cluster d) capacity

iv) Larger cells are more useful in _____
   a) densely populated urban areas b) rural areas
   c) lightly populated urban areas d) mountainous areas

v) BSS in GSM stands for _____
   a) Basic Service Set b) Base Station Subsystem
   c) Basic Station System d) Basic Service System

vi) Beacon contains

a) Timestamp

b) Synchronization information

c) Power Management and Roaming Information

d) All of these

vii) What is the basic service unit of cellular telephony ?

a) Location area b) Cell

c) PLMN service area d) MSC/VLR service area

viii) MSISDN number consists of

a) Country Code b) National Destination Code

c) Subscriber number d) All of these

ix) In IEEE 802.11 Wireless LAN which signal is used for synchronization.

a) Probe b) Beacon c) PS Poll d) Sync

x) Which of the following is not a classical TCP mechanism ?

a) Slow Start b) Fast recovery

c) Selective retransmission d) Congestion control

B) Fill in the blanks or **True/False** : **4**

i) _____ protocol is used for IEEE 802.11 physical layer frame.

ii) Access Point in main controller in ad-hoc wireless network. (True/False)

iii) In PRMA _____ reservation scheme is used.

iv) In DSSS chipping sequence is used to spread the signal. (True/False)

2. A) Write short notes on the following : **(4+4)**

i) Mobile TCP

ii) Piconet.

B) Answer the following : **(3+3)**

i) Discuss about MOC.

ii) Explain signal propagation.

3. Answer the following : **(7+7)**

   A) How the problem of hidden and exposed terminal is solved using MACA ?

   B) What is digital modulation ? Explain three basic techniques of it.

4. Answer the following : **(7+7)**

   A) Explain different mobile services provided by GSM.

   B) How the power management is performed in IEEE 802.11 ?

5. Answer the following : **(7+7)**

   A) Explain FHSS in detail with types of hopping. Give the description about its transmitter and receiver with diagram.

   B) What are the various issues to be considered in designing the wireless LAN environment ?

6. Answer the following : **(7+7)**

   A) What are the different entities and terminologies for mobile IP ?

   B) Discuss in detail the Mobile Terminated Call scheme.

7. Answer the following : **(7+7)**

   A) Explain indirect TCP with advantages.

   B) What is handover ? Explain its types with diagram.

SLR-CK – 16

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
COMPUTER SCIENCE (Paper – XII)
Modeling and Simulation

Day and Date : Friday, 21-11-2014 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

i) PERT is used for the project involving activity of non-repetitive nature in which time estimation are _____

a) Certain b) Uncertain
c) Deterministic d) Both b) and c)

ii) Simulation of system in which the state changes smoothly with time are called _____

a) Continuous system b) Discrete system
c) Both a) and b) d) None of these

iii) Which of the following is not an assumption underlying the fundamental problem of EOQ ?

a) Demand is known and uniform
b) Holding cost per unit per time is constant
c) Lead time not zero
d) Shortages are not permitted

iv) In queue model completely specified in the symbolic form (a/b/c/) : (d/e), the third symbol 'c' specifies _____

a) The number of customers arrive
b) The number of servers
c) The distribution of arrival
d) The distribution of departure

v) If in Markov chain of two states j and k, one step transition probabilities are $P_{jj} = 1$, $P_{jk} = 0$, $P_{kj} = 0$, $P_{kk} = 1$ then value of $P_{jk}^{(4)}$ is

a) 0.5 b) 1

c) 0.4 d) 0

vi) For _____ distribution mean and variance are same.

a) Binomial distribution b) Bernoulli distribution

b) Poisson distribution d) None of these

vii) The time interval between successive arrival of customer in the queue follows _____ distribution.

a) Geometric b) Hypergeometric distribution

c) Binomial d) Exponential

viii) Time gap between placing of an order and its actual arrival in the inventory is known as _____

a) Lead time b) Demand

c) Both a) and b) d) None of the above

ix) In M/M/1 : ∞/FCFS queue model if λ is mean customer arrival rate and μ is the mean service rate then the probability of server being busy is equal to

a) $\frac{\lambda}{\mu}$ b) $\frac{\lambda}{\mu - \lambda}$

c) $\frac{\mu}{\mu - \lambda}$ d) $\frac{\mu}{\lambda}$

x) Markov chain said to be erotic chain if _____ of whose states are ergodic.

a) One b) Some

c) All d) None

B) Fill in the blanks : **4**

i) The long form of the CPM is _____

ii) Chapman-Kolmogorov equation is $P_{ij}(t + T)$ = _____

iii) The time between the placement of two successive order is referred as an _____

iv) Let λ is arrival rate and μ is service rate, if $\lambda > \mu$ the queue is formed and _____ with time.

2. A) i) What are the advantages and disadvantages of simulation ? **4**
   ii) Explain the concept of anticipation inventory with example. **4**

   B) i) A road transport company has one reservation clerk on duty at a time. He handles information of bus schedules and makes reservations. Customers arrive at a rate of 8 per hour and the clerk can service 12 customers on an average per hour. After stating your assumption, find the average waiting time of customer. **3**
   ii) Write a note on queue configuration. **3**

3. A) Explain the pure birth process. **7**

   B) The demand rate for a particular item is 12000 units/year. The ordering cost of Rs. 1000 per order and the holding cost is Rs. 0.80 per month. If no shortage are allowed and the replacement is instantaneous the determine **7**
   i) Economic order quantity
   ii) Number of order per year.

4. A) Describe the deterministic inventory model of EOQ with uniform demand and no shortages. **7**

   B) For various activity in the particular project the expected time (in days) of completions are as follow : **7**

Activity	0 – 1	1 – 3	1 – 2	2 – 3	1 – 4	3 – 4	4 – 5
Duration	3	16	6	8	10	5	3

   Draw a network diagram and identify the critical path.

5. A) Generate the five successive random number X_i, i = 1, 2, 3, 4, 5 by using $X_{i+1} = X_i * a$ (modulo m), starting with seed $X_0 = 3$ and parameters a = 7 and m = 15 (where m means that the number {Xi*a} is divided by m repeatedly till the reminder is less than m). **7**

   B) Explain the system of steady-state equation. **7**

6. A) Give the steps of Monte-Carlo simulation. **7**

   B) Explain the generation of a random sample from exponential distribution. **7**

7. A) Explain the concept of queue discipline. **7**

   B) Explain the Poisson process $\{N(t); t \geq 0\}$. Show that N(t) follows Poisson process. **7**

SLR-CK – 17

Seat No.	

M.Sc. (Part – II) (Sem. – IV) Examination, 2014
COMPUTER SCIENCE (Paper – XIII)
Distributed Operating System

Day and Date : Saturday, 15-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***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.*

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

1) In a _____ (loosely coupled) system, the processors do not share memory or a clock.

A) Multiprocessor B) Distributed
C) Remote D) Local

2) _____ communication is from one sender to multiple receivers.

A) Many to one B) Many to many
C) One to many D) One to one

3) LAN stands for _____

A) Large Area Network B) Local Area Network
C) Long Area Network D) Lower Area Network

4) The software layer, nearest to hardware, which facilitates launching all the other software utilities and application, is called the _____

A) Information technology B) Information system
C) Operating system D) All of the above

5) All distributed systems are _____

A) SISD B) SIMD C) MISD D) MIMD

P.T.O.

6) ISO stands for _____
   A) International Organization for Standardization
   B) International Standard Organization
   C) International Standard Operation
   D) Important Standard Operation

7) When a packet is sent to an address, it is automatically delivered to all machines listening to the address. This technique is called _____
   A) Unicasting B) Broadcasting
   C) Multicasting D) Point to point transmission

8) A _____ OS allows and manages several programs to be simultaneously resident in main memory.
   A) Multi-programming B) Single-programming
   C) External-programming D) All of the above

9) When the job is completed, the output is actually printed; this form of processing is called _____
   A) Resource allocator B) Control program
   C) Spooling D) All of the above

10) A computer system dedicated to a single user. This type of computer system is usually referred to as _____
   A) Mainframe computer B) Mini computer
   C) Super computer D) Personal computer

B) State **true** or **false** : **4**

1) An open system is prepared to communicate with any other open system by using standard rules.

2) Packing parameters into a message is called parameter marshalling.

3) Location transparency does not refer to the fact that is in a true distributed system.

4) Concurrency transparency means multiple users can share resources automatically.

2. A) Write short notes on the following : **8**
   i) Remote access file service interface.
   ii) Lamport's happens before relation.

   B) Answer the following : **6**
   i) What do you mean by Windows NT and Novel Netware ?
   ii) What do you mean by Client server model ?

3. Answer the following : **14**
   A) Define deadlock. State and explain in detail the necessary conditions to occur a deadlock.
   B) Explain in detail Layered protocol with necessary diagram.

4. Answer the following : **14**
   A) Explain in detail the concept of remote procedure call.
   B) Explain in detail how deadlock prevention took place in distributed systems.

5. Answer the following : **14**
   A) What is the mutual exclusion ? Explain the central and distributed algorithms.
   B) What is distributed file system ? Explain the implementation of it in detail.

6. Answer the following : **14**
   A) Explain in detail the workstation model as the system model.
   B) Explain in detail the concept of atomic transaction.

7. Answer the following : **14**
   A) Define Thread. Explain in detail the thread usage in terms of three organizations of it in a process.
   B) Explain in detail advantages and disadvantages of distributed systems over centralized and over personal computer systems.

SLR-CK – 18

Seat No.	

M.Sc. (Semester – IV) Examination, 2014
COMPUTER SCIENCE
Data Mining and Warehouse (Paper – XIV)

Day and Date : Tuesday, 18-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***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.*

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

1) The following is true of three-tier data warehouses

a) Once created, the data marts will keep on being updated from the data warehouse at periodic times

b) Once created, the data marts will directly receive their new data from the operational databases

c) The data marts are different groups of tables in the data warehouse

d) A data mart becomes a data warehouse when it reaches a critical size

2) _____ will answer questions you did not think to ask of your data.

a) Data mining b) Data extrapolation

c) Knowledge discovery d) Data enlightenment

3) The following technology is not well-suited for data mining

a) Expert system technology

b) Data visualization

c) Technology limited to specific data types such as numeric data types

d) Parallel architecture

4) The slice operation performs a selection on _____ of the given cube.

a) One dimension b) Two dimension

c) More than two dimension d) None of the above

5) _____ is the oldest and most well known statistical technique that the data mining community utilizes.

a) Regression b) Clustering

c) Decision Trees d) None of the above

6) It is difficult to find strong associations among data items at low or primitive levels of abstraction due to the _____ of data in multidimensional space.

a) Sparsity b) Scarcity

c) Plenty d) Excess

7) _____ attributes are numeric and have an implicit ordering among values.

a) Quantitative b) Nominal

c) Categorical d) None of the above

8) In the K-means clustering algorithm the distance between cluster centroid to each object is calculated using _____ method.

a) Euclidean distance b) Clustering distance

c) Central distance d) Cluster width

9) Hierarchical clustering may be represented by a two-dimensional diagram known as _____

a) Dendrogram b) Cladogram

c) Histogram d) None of the above

10) _____ is the process of removing attributes in the data that are irrelevant to the classification or prediction task.

a) Relevance analysis b) Data cleaning

c) Data transformation d) Normalization

B) Fill in the blanks : **4**

1) Regression, classification and _____ are the data mining tasks.

2) The process of removing the deficiencies and loopholes in the data is called as _____ up of data.

3) Pivot is also called _____

4) The _____ schema is a variant of the star schema model, where some dimension tables are normalized.

2. A) Write short notes on the following : **8**
   i) Data Transformation
   ii) Model-Based Clustering.

   B) Answer the following : **6**
   i) What is data cube ? Explain star schema.
   ii) Explain in short types of data in cluster analysis.

3. Answer the following :
   A) Explain data mining applications. **7**
   B) Explain data mining primitives with example. **7**

4. Answer the following :
   A) Discuss 3-tier architecture of data warehouse with a neat diagram. Explain in detail the functionality of each component. **8**
   B) What is noisy data ? Explain different techniques to smooth out the data to remove the noise. **6**

5. Answer the following :
   A) Explain decision tree induction method. **7**
   B) What are the different criteria on which classification and prediction methods can be evaluated ? **7**

6. Answer the following :
   A) Discuss the concepts of frequent itemset, support and confidence. **7**
   B) Explain trends in data mining. **7**

7. Answer the following :
   A) What is meant by hierarchical clustering ? Explain, how agglomerative method is different from divisive clustering method. **8**
   B) Explain Bayesian classification scheme. **6**

SLR-CK – 19

Seat No.	

M.Sc. – II (Semester – IV) Examination, 2014
COMPUTER SCIENCE
Digital Image Processing (Paper – XV)

Day and Date : Thursday, 20-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***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.*

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

1) The outputs of object recognition are generally
   a) Images
   b) Attributes of images
   c) Both images and attributes of images
   d) Either images or attributes of images

2) An image of size 10×5 pixel formed with 256 gray levels need _____ bits of storage space.
   a) 400 b) 50
   c) 12800 d) 500

3) D4 distance between (7, 3) and (5, 8) is _____
   a) 3 b) 1
   c) 5 d) $\sqrt{13}$

4) Averaging filter is a _____
   a) Smoothing linear filter b) Sharpening linear filter
   c) Order statistics filter d) Median filter

5) Arrange the following filters from very smooth filter to very sharp filter.
   a) Butterworth filter, Gaussian filter, Ideal filter
   b) Gaussian filter, Butterworth filter, Ideal filter
   c) Ideal filter, Gaussian filter, Butterworth filter
   d) Ideal filter, Butterworth filter, Gaussian filter

6) Midpoint filter is one of the _____ filters.

a) Mean b) Adaptive

c) Order statistics d) Frequency domain

7) To eliminate small holes in the image the best morphological tool is _____

a) Dilation b) Erosion

c) Opening d) Closing

8) In an image whose gray level profile is ramp or slope, its first order derivative is _____

a) Zero b) Constant

c) Monotonically increasing d) Transition between positive and negative

9) The four directional chain code of an object is 0003230322210121. Its shape number is _____

a) 0033113300331133 b) 0033003311331133

c) 0033113311330033 d) 0033003311330033

10) The American Banker Association E-13B character recognition system recognizes the characters based on the _____

a) Area of ink under reader head

b) Difference of area of ink between previous and present position

c) Width of ink bar

d) Length of ink bar

B) Fill in the blanks : **4**

1) The distance between a pixel and its diagonal neighbour is _____ units.

2) According to Fourier any function which periodically repeats itself may be written as the _____ of different frequencies, each multiplied by a different coefficient.

3) The translation of set A by point $Z = \{z_1 , z_2\}$, denoted $(A)_z$ is defined as _____

4) The expression $y = A(x - m_x)$ is called as _____

2. A) Write short notes on the following : **8**

i) Role of bit planes in image.

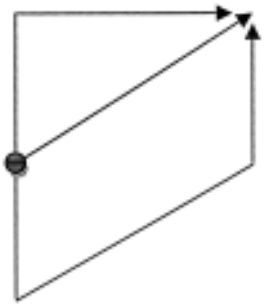
ii) How homomorphic filtering differs from other frequency domain filtering ? Discuss.

B) Answer the following : **6**

i) Find the shortest digital path between P and Q using m-adjacency.

1	0	0	P	1	0	1
1	1	1	0	1	1	0
0	1	1	1	0	1	1
0	1	0	0	1	1	0
1	1	0	1	1	0	1
1	0	1	1	0	1	0
0	1	0	Q	0	0	1

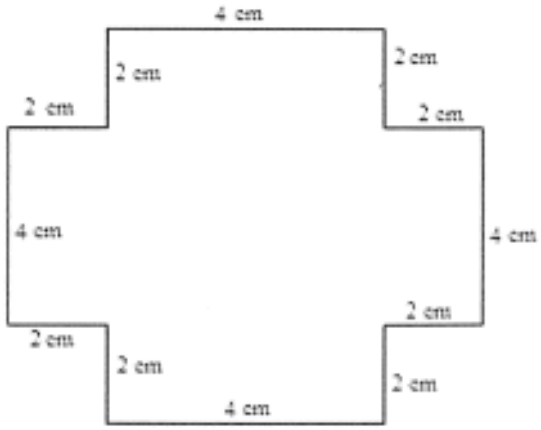
ii) Use the specific primitives a, b, c and d given as ↘ , ↗ , → and ↓ respectively and build the following structure :



3. Answer the following : **14**

A) Explain nearest neighbourhood, pixel replication and bilinear interpolation techniques.

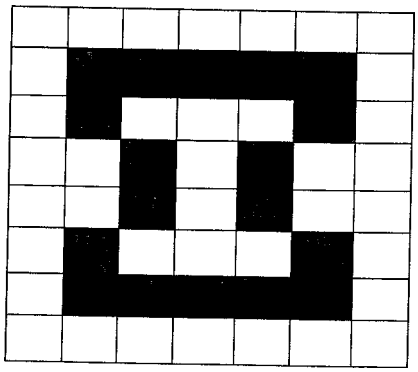
B) Perform opening of following structure using a circle of 1 cm radius :



4. Answer the following : **14**

   A) Discuss similarity and dissimilarity between different basic gray level transformations.

   B) Fill the following region using morphological region filling algorithms :



5. Answer the following : **14**

   A) Discuss one dimensional Fourier transform and its inverse with an example.

   B) Compute the covariance matrix for the following vectors : $(0, 1, 0, 0)^T$, $(0, 0, 0, 1)^T$, $(1, 1, 1, 1)^T$ and $(1, 0, 1, 0)^T$.

6. Answer the following : **14**

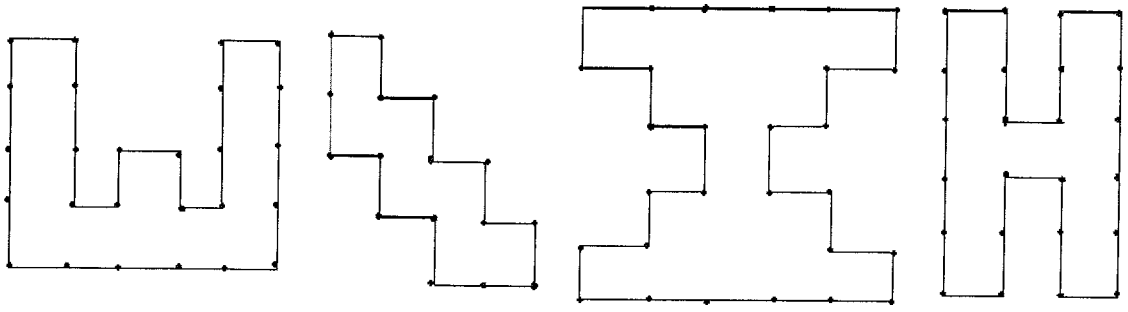
   A) What are the different types of discontinuities ? How they are detected ? Briefly explain.

   B) The two classes of objects denoted by ω_1 and ω_2 have sample mean vectors $m_1 = (2, 7, 5)$ and $m_2 = (8, 4, 2)$ respectively. Compute decision boundary between these two objects.

7. Answer the following : **14**

   A) Explain minimum distance classifier method for pattern matching with example.

   B) Compute the distances between following objects and find out which of them are nearest :



(a) (b) (c) (d)

SLR-CK – 20

Seat No.	

M.Sc. – II (Semester – IV) (Computer Science) Examination, 2014
.NET (Paper – XVI)

Day and Date : Saturday, 22-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***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.*

1. A) **Each** question below gives a multiple choice of answers, choose the most appropriate **one** : **10**

1) A _____ can override method from its base class.
a) sub class b) sealed class
c) partial class d) super class

2) A _____ method of class that's run as soon as it is instantiated.
a) constructor b) accessor
c) mutator d) init()

3) The + = and – = are _____ kind of operator.
a) binary b) ternary
c) unary d) compound

4) There are about _____ reserved words in C#.
a) 87 b) 77
c) 76 d) 78

5) _____ is the way of listing all of the namespaces used in the program.
a) Namespace b) Using
c) Include d) Import

6) An instance of _____ collection only works with one specific type.
a) Dictionary b) List
c) Generic d) Array

P.T.O.

7) All generic collection implements _____ interface.

a) Innumerable b) Enumeration

c) Generic d) Abstract

8) _____ is an easy way to keep track of categories.

a) Enum b) Attributes

c) Modifiers d) Constants

9) _____ binary formatter method reads an object from stream.

a) Serialize b) Desearialize

c) Marshall d) UnMarshall

10) _____ encoding system that assigns unique number of each character.

a) Unicode b) Binary

c) EBCDIC d) ASCII

B) State following statements are **true** or **false** : **4**

1) *Fileinfo* class lets user perform all operations in the file class for specific file.

2) Accessor method gets the value of a property.

3) The Tab control of windows form that lets you to create tabbed application.

4) Two references means there are two ways to change an objects data.

2. A) Write short notes on the following : **8**

i) Core services of DOT NET Framework.

ii) DOT NET Layered architecture.

B) Answer the following : **6**

i) Can constructor of class is defined as static ? Explain with example.

ii) What is Delegate ? Explain the properties of Delegate.

3. Answer the following :

   A) Differentiate in between ASP and ASP.NET. **7**

   B) What are sealed classes ? What is the benefit of using sealed class ? **7**

4. Answer the following :

   A) What is master page ? Write stepwise process of creating master page. **7**

   B) What is inheritance ? Explain how inheritance is restricted in C#. **7**

5. Answer the following :

   A) What is difference in regular object reference and an interface reference ? **7**

   B) Write C# program to find *maximum* and *minimum* number from an array. **7**

6. Answer the following :

   A) Explain ASP.NET page events and attributes of page directives with example. **7**

   B) What is Validator ? Describe purpose of regular expression validator with example. **7**

7. Answer the following :

   A) Explain classification of DOT NET Data providers. **7**

   B) Define WebForm. Explain how to maintain the state of Webform with suitable example. **7**

SLR-CK – 1

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (New)
Object Oriented Programming using C++ (Paper – I)

Day and Date : Friday, 14-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) Which of the following is not a type of constructor ?

A) Copy constructor B) Friend constructor

C) Default constructor D) Parameterized constructor

2) Which of the following is not the member of class ?

A) Friend function B) Static function

C) Const. function D) Virtual function

3) A class is a _____ data type.

A) Primitive B) Derived

C) User-defined D) All of these

4) _____ keyword is used to declare integer variables.

A) int B) Integer

C) Float D) Character

5) Which of the following approach is adapted by C++ ?

A) Top-down B) Bottom-up

C) Right-left D) Left-right

6) A/an _____ function is a function that is expanded in line when it is invoked.

A) Inline B) Friend

C) Complex D) Member

P.T.O.

7) Which of the following concepts means wrapping up of data and function together ?

A) Abstraction B) Inheritance

C) Polymorphism D) Encapsulation

8) Which of the following problem causes an exception ?

A) A run-time error

B) A problem in calling function

C) A syntax error

D) Missing semicolon in statement in main()

9) The mechanism of deriving a new class from base is known as _____

A) Abstraction B) Inheritance

C) Polymorphism D) Encapsulation

10) The scope resolution operator is represented by _____

A) ?: B) ->

C) :: D) #

B) State whether following statements are **true** or **false** : **4**

1) Manipulators are operators that are used to format the data display.

2) A constructor has the different name as that of a class.

3) A virtual function can be a friend of another class.

4) By default, members of the class are public.

2. A) Write a short note on following : **8**

i) Algorithm

ii) Inline function

B) Answer the following : **6**

i) What is function prototyping ? Explain with example.

ii) Explain difference between structure and union.

3. Answer the following :

   A) What is arrays of object ? Explain with example. **7**

   B) Explain the use of new and delete operator with example. **7**

4. Answer the following :

   A) Explain the importance of pointers to object with example. **7**

   B) Write a program in C++ to overload unary minus (–) operator. **7**

5. Answer the following :

   A) What is inheritance ? Explain different types of inheritances with example and syntax. **7**

   B) What is virtual function ? Explain characteristics of virtual function. **7**

6. Answer the following :

   A) Write a program to implement parameterized constructor. **7**

   B) What is manipulator ? Explain the use of width() and fill() manipulators. **7**

7. Answer the following :

   A) What is file ? Explain different types of files. **7**

   B) Write a program which contains class named 'MATRIX'. This class should include two member functions get() and put() to input elements in matrix of order 3×3 and display only diagonal elements of that matrix respectively. **7**

SLR-CK – 2

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Paper – II)
Numerical Analysis (New)

Day and Date : Monday, 17-11-2014 Max. Marks :70

Time : 11.00 a.m. to 2.00 p.m.

Instructions** : 1) Q. No. **1** and Q. No. **2** are **compulsory.

*2) Attempt **any three** questions from Q. No. **3** to Q. No. **7**.*

*3) Figures to the **right** indicate **full** marks.*

*4) **Use** of calculator is **allowed.***

1. A) **True** or **False** (**one** mark **each**) : **4**

i) Error in Trapezoidal rule is – (b – a) y(x).

ii) Newton's forward interpolation formula is useful for interpolation near the beginning of tabular values.

iii) Secant method is also called regula falsi method.

iv) Gaussian elimination method is used to reduce the given system to upper triangular system.

B) Choose correct alternative (**one** mark **each**) : **5**

i) The real root of the equation $x^3 - 9x + 1 = 0$ lies between _____

a) 0 and 1 b) 1 and 2 c) 2 and 3 d) 3 and 4

ii) If f(1) = 1, f(2) = 4, f(3) = 9, f(4) = 16 then this tabular values are interpolated by a polynomial p(x) of degree _____

a) 2 b) 3 c) 4 d) 5

iii) If x_n is the n^{th} iterate, the Newton Raphson formula is given by _____

a) $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$ b) $x_{n+1} = x_n - \frac{f(x_n)}{f(x_n)}$

c) $x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$ d) None of these

P.T.O.

iv) While applying Simpson's $\frac{1}{3}^{rd}$ rule the number of subintervals should be _____

a) Multiple of 3 b) Multiple of 5 c) Odd d) Even

v) If f(0) = 1 and f(1) = 3 then the unique polynomial of degree 1 is _____

a) 3 – 2x b) x – 3 c) 2x + 1 d) 2x – 1

C) Define the following (**one** mark **each**) : **5**

i) Round off error

ii) Rate of convergence

iii) Newton's forward difference interpolation formula

iv) Eigen value and eigen vector of matrix

v) Significant digits.

2. i) Write the error's in trapezoidal, Simpson's $\frac{1}{3}^{rd}$ and Simpson's $\frac{3}{8}^{th}$ rule. **3**

ii) Using Lagrange's interpolation formula find sin (3) from following tabular values. **4**

x	0	2	4
y = sinx	0	0.9093	- 0.7568

iii) Write Newton's forward and backward interpolation formula. **3**

iv) Prove that : **4**

a) $\mu^2 = 1 + \frac{\delta^2}{4}$ b) $\Delta - \nabla = \Delta\nabla$

3. i) Derive Newton's divided difference interpolation formula. **7**

ii) Perform four iterations of Newton Raphson method to find a real root of the equation $x^3 - 5x - 4 = 0$. **7**

4. i) Explain Bisection method. **7**

   ii) Apply Lagrange's method to find a cubic polynomial which approximates the following data : **7**

x	- 2	- 1	2	3
y = f(x)	- 12	- 8	3	5

5. i) Use Gauss elimination to solve : **6**

   $10x + y + z = 12$

   $2x + 10y + z = 13$

   $x + y + 3z = 5$

   ii) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ using Trapezoidal rule with h = 0.1. **8**

6. i) Find the largest eigen value and corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 3 & -1 \\ 3 & 2 & 4 \\ -1 & 4 & 10 \end{bmatrix}$$ **7**

   ii) Given the differential equation $y'' - xy' - y = 0$ with the conditions y(0) = 1, y'(0) = 0. Use Taylor's series method to determine the value of y(0.1). **7**

7. i) Decompose the matrix $A = \begin{bmatrix} 4 & 3 & 2 \\ 2 & 3 & 4 \\ 1 & 2 & 1 \end{bmatrix}$ in to the form LU, where L is a lower triangular matrix and U is unit upper triangular matrix. **7**

   ii) Using Newton's forward interpolation formula to find y(4) from following data : **7**

x	3	5	7	9	11
y = f(x)	13	31	57	91	111

SLR-CK – 3

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
COMPUTER SCIENCE
Paper – III : Software Engineering (New)

Day and Date : Wednesday, 19-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) Which of the following is a tool in design phase ?
   a) Abstraction b) Refinement
   c) Information hiding d) All of these

2) Which of the items listed below is not one of the software engineering layers ?
   a) Process b) Tools
   c) Methods d) Manufacturing

3) Data dictionary contains details of
   a) Data structures b) Data flows
   c) Data stores d) All of these

4) SRS stands for _____
   a) Software Requirement Specification
   b) Software Requirement Solutions
   c) System Requirement Specification
   d) None of the above

5) If requirements are frequently changing, which model is to be selected ?
   a) Waterfall model b) Prototyping model
   c) Iterative model d) RAD model

6) Which is not a characteristics of a good SRS ?

a) Correct b) Complete c) Consistent d) Brief

7) Which one is a quality attribute ?

a) Reliability b) Availability c) Security d) All of the above

8) DFD stands for _____

a) Data Flow Design

b) Data Flow Diagram

c) Descriptive Functional Design

d) None of the above

9) Which one is not a strategy for design ?

a) Bottom up design b) Top down design

c) Embedded design d) Hybrid design

10) The extent to which different modules are dependent upon each other is called _____

a) Coupling b) Cohesion c) Modularity d) Stability

B) State **True** or **False** : **4**

1) Design patterns are best thought of as coding pattern.

2) Software design is an iterative generic process that may be applied without modification to any software project.

3) Fault is defect in a program or mistake in program or error in the program.

4) Level-0 data flow diagram is similar to the context diagram.

2. A) Write short note on following : **8**

1) Design post processing

2) Project metrics.

B) Answer the following : **6**

1) Explain Metrics indicators.

2) Explain Object Oriented Testing.

3. Answer the following :

   A) What are the advantages and disadvantages of prototyping model ? **7**

   B) Explain evolutionary software process model. **7**

4. Answer the following :

   A) Explain MC Call's Quality factors used in software engineering. **7**

   B) Explain function point metrics used in the analysis model. **7**

5. Answer the following :

   A) What is meant by software requirement specification ? Explain the characteristics of good SRS. **7**

   B) Explain structured analysis in detail. **7**

6. Answer the following :

   A) Explain the various strategies used for software testing. **7**

   B) Explain how we can manage object oriented software projects. **7**

7. Answer the following :

   A) Explain functional modeling and behavioral modeling in detail. **7**

   B) What is software design ? Explain how we can transform informal design to a detailed design. **7**

SLR-CK – 4

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
COMPUTER SCIENCE (Paper – IV)
Data Structures (New)

Day and Date : Friday, 21-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) The rule is therefore widely accepted that the associated _____ is made explicit in a declaration of the constant, variable or function.
   a) Linked List b) Data Type
   c) Binary Tree d) Sentence Case

2) A one of the demerit of priority queue is that it may lead to a problem of _____, which keeps elements of queue in indefinite blocking state.
   a) Fragmentation b) Compaction
   c) Starvation d) Data Hiding

3) A _____ matrix indicates almost all its elements are zero.
   a) 3-Dimensional Matrix b) 2-Dimensional Matrix
   c) Multidimensional Matrix d) Sparse Matrix

4) A _____ cells, uses pointers to link successive list elements as well as consisting of an element of the list and a pointer to the next cell on the list.
   a) Stack b) Matrix
   c) Tree d) Singly Linked

5) It is difficult to find a “perfect” _____ that is a function that has no collisions.
   a) Indexing Function b) Do While Loop
   c) Hash Function d) Nested Function

P.T.O.

6) A _____ imposes a hierarchical structure on a collection of items. Familiar examples of _____ are genealogies and organization charts.

a) Linear Search b) Software

c) Tree d) Queue

7) A _____ algorithm is that it always chooses the closest vertex to the source among those whose _____ is not yet known.

a) Shortest path b) Dynamic Programming

c) Backtracking d) None of these

8) A _____ data structure used to evaluate _____ expression.

a) Queue and Algebraic b) Queue and Arithmetic

c) Stack and Algebraic d) Stack and Arithmetic

9) If a binary tree of arithmetic expression needs to be traversed and result is in form that an operator is in between the operands, then it's a _____ traversing.

a) Pre-order b) In-order

c) Ascending d) Descending

10) The _____, *which* is a finite sequence of instructions, each of which has a clear meaning ?

a) Data structure b) Problem solver

c) Algorithm d) Flowchart

B) State **True** or **False** : **4**

1) An Insertion Sort is a good example of Divide and Conquer.

2) A dynamic programming produces the answer far more rapidly than the try all permutations method.

3) The approach is called breadth-first because from each vertex ν that user visit as user search as broadly as possible by next visiting all the vertices adjacent to ν as well as each vertex visited is placed in the queue once.

4) This index is to be an integer between 0 and n-1, where n is the number of elements, the *size*, of the array.

2. A) Write a short note : **8**

1) Backtracking

2) Multidimensional Array.

B) Answer the following : **6**

1) What do you mean by Circular Queue ?

2) Define the term Data Structure.

3. Answer the following :

A) Define the term Doubly Linked List. Explain in detail various operations on Doubly Linked List with suitable example. **7**

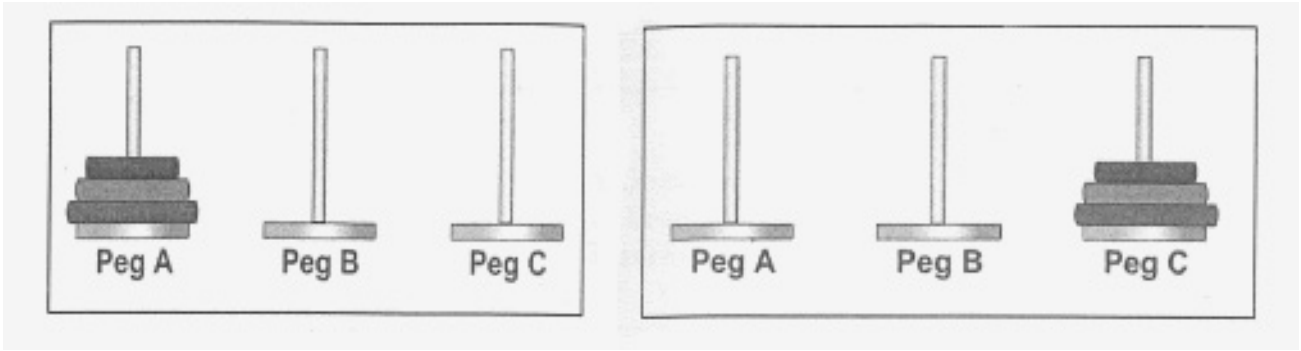
B) What do you mean by Binary Tree ? Generate a Binary tree from given series and show the results of Pre-order, In-order and Post-order traversing at constructed Binary tree. **7**

Series : 8, 91, 26, 83, 3, 12, 39, 5, 72, 100, 55, 60, 43, 10, 66.

4. Answer the following :

A) Define the meaning of Queue ? Explain in detail Dequeue and operations on it with suitable example. **7**

B) Enlist the various applications of stack. Discuss in detail the Tower of Hanoi problem and its solution with respect to following Initial and to achieve the shown Goal State. **7**



(a) Initial State (b) Goal State

5. Answer the following :

A) Define the term Sorting. Perform Bubble Sort and show the result in passes on following series :

Series : 39, 200, 55, 6, 190, 49, 26, 133, 8, 69, 532, 13, 70. **7**

B) Discuss representations and applications of Single Dimensional and Two Dimensional with suitable example. **7**

6. Answer the following :

   A) State the algorithm for conversion of infix into postfix string. Apply the same on given infix expression show its conversion into postfix string. **7**

   Infix Expression : ((f + e) + b * (c + d) + a) * (h + g).

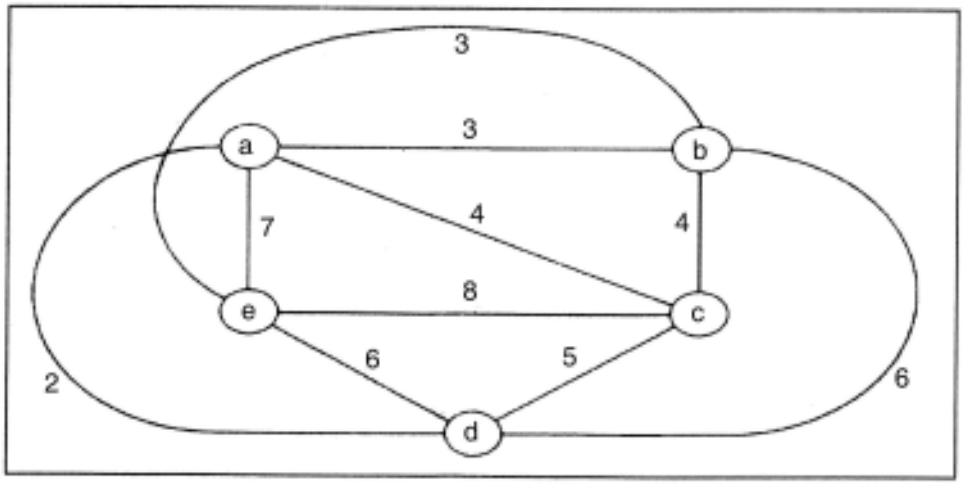
   B) What is the algorithm of Binary Search and Linear Search and also show the results of the both of the search on given series to find the digit 100 in it. **7**

   Series : 3, 10, 1, 613, 19, 100, 61, 35, 98, 13, 89, 77, 6, 55, 103.

7. Answer the following :

   A) What do you mean by Tree ? State and explain Breadth and Depth First search as a classical tree traversing algorithm with suitable example. **7**

   B) What is the Dijkstra's algorithm ? Discuss how it will be useful for visiting all nodes shown in graph while not visiting each node twice but at least once. **7**



SLR-CK – 5

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Old)
Object Oriented Programming Using C++ (Paper – I)

Day and Date : Friday, 14-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) Which of the following header file includes definition of cin and cout ?
   A) istream.h B) ostream.h
   C) iomanip.h D) iostream.h

2) Which of the following provides a reuse mechanism ?
   A) Abstraction B) Inheritance
   C) Dynamic binding D) Encapsulation

3) A constructor that accepts _____ parameters is called the default constructor.
   A) One B) Two C) Three D) No

4) Destructor has the same name as the constructor and it is preceded by _____
   A) ~ B) | C) ? D) $

5) Array indexing always starts with the number
   A) 1 B) 0 C) 2 D) – 1

6) Setprecision requires the header file _____

A) stdlib.h B) iomanip.h C) console.h D) conio.h

7) Which of the following is user defined data type ?

A) Public B) Private

C) Class D) Both A) and B)

8) The static member variable is initialized to _____

A) 0 B) 1 C) 2 D) 3

9) The mechanism that binds code and data together and keeps them secure from outside world is known as _____

A) Abstraction B) Encapsulation

C) Inheritance D) Polymorphism

10) What does your class can hold ?

A) Data B) Function

C) Both A) and B) D) None of these

B) State whether following statements are **True** or **False** : **4**

1) An inline function is a function that is expanded in line when it is invoked.

2) We cannot have virtual constructors, but we can have virtual destructors.

3) In operator overloading, we can change the basic meaning of an operator.

4) A destructor is used to destroy the object that have been created by constructor.

2. A) Write a short note on following : **8**

i) Function overloading

ii) Inline function.

B) Answer the following : **6**

i) Define flowchart. Explain different symbols used in flowchart.

ii) Explain primary data types used in C++.

3. Answer the following :

   A) What is manipulator ? Explain the use of width ( ), precision and fill ( ) manipulators. **7**

   B) What is arrays of objects ? Explain with example. **7**

4. Answer the following :

   A) Write a program in C++ to study parameterized constructor. **7**

   B) What is template ? Explain class template. **7**

5. Answer the following :

   A) Write a C++ program to implement multilevel inheritance. **7**

   B) What do you mean by operator overloading ? Explain with suitable example. **7**

6. Answer the following :

   A) What is virtual function ? Explain characteristics of virtual functions. **7**

   B) Explain various concepts of object oriented programming. **7**

7. Answer the following :

   A) Define a file. Explain I/O commands in file handling. **7**

   B) Explain call by reference and return by reference with example. **7**

SLR-CK – 6

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Old)
Paper – II : Numerical Analysis

Day and Date : Monday, 17-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *i) Question No. **1** and **2** are **compulsory**.*
*ii) Attempt **any three** questions from Q. No. **3** to Q. No. **7**.*
*iii) Figures to the **right** indicate **full** marks.*
*iv) **Use** of simple or scientific calculator is **allowed**.*

1. A) Select most correct alternative. **10**

i) The next iterative value of the root of $x^2 - 4 = 0$ using Newton-Raphson method, if the initial guess is 3, is

a) 1.5 b) 2.067 c) 2.167 d) 3.000

ii) The number 02.56×10^4 has _____ significant digits.

a) 3 b) 4 c) 5 d) 6

iii) Given $A = \begin{bmatrix} 6 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 6 \end{bmatrix}$ then A is _____ matrix.

a) a diagonal b) an identity
c) an upper triangular d) a lower triangular

iv) The truncation error in calculating $f'(2)$ for $f(x) = x^2$ by $f'(x) \approx \frac{f(x+h) - f(x)}{h}$ with h = 0.2 is

a) -0.2 b) 0.2 c) 4 d) 4.2

v) In composite Trapezoidal rule the number of segments n must be

a) any positive integer b) an odd number
c) an even number d) multiple of 3

P.T.O.

vi) $(y''')^2 + 5y' = 0$ is a _____ differential equation.

a) first-degree, third-order b) third-degree, second-order

c) third-degree, first-order d) second-degree, third-order

vii) The finite difference $y_1 - y_0$, where $y_i = f(x_i)$, is denoted by

a) Δy_0 b) ∇y_0 c) $\delta y_{3/2}$ d) None of these

viii) If $p(x) = a_0 + a_1x$, $p(100) = 3/7$ and $p(101) = -4/7$ then a_0 = _____ (approximately).

a) 101.4 b) –101.4 c) 100.4 d) 100

ix) The techniques and methods for solving systems of linear algebraic equations belong to

a) elimination approach

b) iterative approach

c) a) and b)

d) neither a) nor b)

x) The system of equations : $6x - 3y = 8$, $2x - y = 5$ has

a) no solution b) unique solution

c) two solutions d) many solutions

B) Fill in the blanks : **4**

i) The general solution of the differential equation $y' = ae^x$ is _____

ii) The three point Newton-cotes formula is _____ rule.

iii) For the function $x^2 - 4x - 10 = 0$ with initial estimates of $x_1 = 1$ and $x_2 = 4$, by using secant method the next estimate x_3 will be _____

iv) If $x_0 = 4$, $x_1 = 2$ and $f_0 = 20$, $f_1 = 10$ then the first divided difference $f[x_0, x_1]$ = _____

2. A) i) Define an absolute error. Three approximate values of the number 2/3 are given as 0.60, 0.66 and 0.67. Verify which of these three is the best approximation. **4**

ii) Define the operators Δ, ∇ and E. Show that $E^{-1}\Delta \equiv \nabla$. **4**

B) i) State mean-value theorem for derivatives. **3**

ii) State the Newton's general interpolation formula. **3**

3. A) Describe Gauss-Seidel method. **7**

   B) Find the value of $\sqrt{7}$ by using Newton-Raphson method and compare it with the value generated on calculator. **7**

4. A) Explain Lagrange's interpolation formula. **7**

   B) Solve the following system of equations by using Gauss elimination method.

   $3x_1 + 6x_2 + x_3 = 16$

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

   $x_1 + 3x_2 + 2x_3 = 9$ **7**

5. A) Write an algorithm of finding the root of f(x) = 0 by regula falsi method. **7**

   B) From the following table, find the area bounded by the curve f(x) and the x-axis from x = 7.47 to x = 7.52 by using suitable rule. **7**

x	7.47	7.48	7.49	7.50	7.51	7.52
y = f(x)	1.93	1.95	1.98	2.01	2.03	2.06

6. A) Describe Simpson's $\frac{1}{3}$ rule. **7**

   B) Given the following information :

x	1	3	7	8
y = f(x)	0	1.0986	1.9459	2.0794

   Find f(5) by using Newton's general interpolation formula. **7**

7. A) Given the equation $\frac{dy}{dx} = xy$ with y(0) = 1. Estimate y(0.4) by Euler's method using h = 0.1. **7**

   B) Given the following information :

x	1	3	5	7
y = f(x)	101	109	125	149

   Find f(2.5) by using Newton's forward difference interpolation formula. **7**

SLR-CK – 7

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE
Software Engineering (Paper – III) (Old)

Day and Date : Wednesday, 19-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) The model in which the requirements are implemented by category is _____
   A) Evolutionary Development Model
   B) Waterfall Model
   C) Prototyping
   D) Iterative Enhancement Model

2) The following can be considered to quality
   A) Customer Satisfaction B) Defects
   C) Rework D) All of these

3) The level at which the software uses scarce resources is
   A) Reliability B) Efficiency
   C) Portability D) All of the above

4) What types of models are created during software requirements analysis ?
   A) Functional and behavioral
   B) Algorithmic and data structure
   C) Architectural and structural
   D) Usability and reliability

5) Requirements can be refined using
   A) The waterfall model B) Prototyping model
   C) The evolutionary model D) The spiral model

6) Structured charts are a product of
   A) Requirements gathering
   B) Requirements analysis
   C) Design
   D) Coding

7) If a program in its functioning has not met user requirements in some way, then it is
   A) an error
   B) a failure
   C) a fault
   D) a defect

8) Which phase is not available in classic life cycle ?
   A) Coding
   B) Testing
   C) Maintenance
   D) Abstraction

9) Which is not a step of requirement engineering ?
   A) Requirements elicitation
   B) Requirements analysis
   C) Requirements design
   D) Requirements documentation

10) Pick odd man out.
   A) Waterfall
   B) RAD
   C) Prototype
   D) Design

B) State **True** or **False** : **4**

1) Software deteriorates rather than wears out because defects are more likely to arise after software has been used often.

2) Definition, development and support are the three generic phases of software engineering.

3) A key concept of quality control is that all work products have measurable specification for process outputs.

4) Software process is a Coherent set of activities for specifying, designing, implementing and testing software systems.

2. A) Write short notes on the following : **8**
   i) Software characteristics.
   ii) Software Quality Assurance.
   B) Answer the following : **6**
   i) State the problems of prototyping.
   ii) State any three differences between Black box testing and White box testing.

3. Answer the following : **14**
   A) Explain the analysis principles in detail.
   B) Explain the Architectural design in detail.

4. Answer the following : **14**
   A) What is testing ? Explain the software testing strategies.
   B) Explain the User Interface Design with help of example.

5. Answer the following : **14**
   A) Explain the metric in process and project domains.
   B) Explain the control structure testing with example.

6. Answer the following : **14**
   A) Explain the Object Oriented Design in detail.
   B) Explain the mechanics of structured analysis in detail.

7. Answer the following : **14**
   A) Explain the different phases involved in waterfall life cycle.
   B) Explain the functional and behavioral modeling in detail.

SLR-CK – 8

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE
Paper – IV : Data Structures (Old)

Day and Date : Friday, 21-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

i) The prefix form of the expression A/B/C is _____

a) /A/BC b) /AB/C c) //ABC d) /ABC/

ii) Some edges in the graph are directed and some are undirected such a graph is called as _____

a) Multi directed graph b) Mixed graph

c) Multigraph d) All of above

iii) The memory address of the first element of an array is called

a) floor address

b) foundation address

c) first address

d) base address

iv) When new data are to be inserted into a data structure, but there is no available space; this situation is usually called

a) underflow b) overflow

c) housefull d) saturated

v) The term “push” and “pop” is related to the

a) array b) lists

c) stacks d) all of above

vi) On which principle does stack work ?
a) FOLI b) FIFO c) LILO d) LIFO

vii) Which sorting technique is best performer in all the cases ?
a) Selection sort b) Heap sort
c) Both (a) and (b) d) None of the above

viii) Which order is not used in traversing of tree ?
a) Root, Left, Right
b) Left, Root, Right
c) Left, Right, Root
d) Right, Left, Root

ix) In which linked list, last node is pointing towards first node ?
a) Circular list
b) Doubly linked list
c) Header linked list
d) One way list

x) Breadth First Search is used in
a) Binary Search Tree
b) Graph
c) Stack
d) Queue

B) **True/False** : **4**

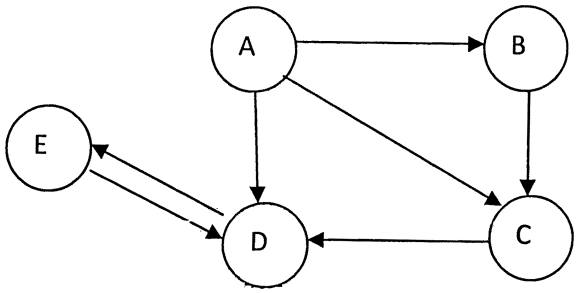
i) Linked list is implemented using arrays
ii) Can stack is described as pointer
iii) A tree contains cycle
iv) Tree is linear data structure.

2. A) Write short notes on following : **8**
1) Analysis of algorithm
2) Priority queue.

B) Answer the following : **6**
i) What are the properties of list structure ? Explain.
ii) Explain recursion.

3. A) What is hashing ? Explain hashing technique in detail. **14**
   B) Explain different types of arrays in detail.

4. A) Explain any one application of linked list with example. **14**
   B) What is graph ? Give adjacency matrix and path matrix for following graph.



5. A) Write C/C++ program to perform various operations on stack. **14**
   B) Explain applications of queue.

6. A) What is searching ? Explain linear search technique with example. **14**
   B) Write an algorithm to add new data at the end of doubly linked list.

7. A) Explain different way of traversing a binary tree with suitable example. **14**
   B) Write an algorithm for bubble sort method.

SLR-CK – 9

Seat No.	

M.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE
Operations Research (Paper – V)

Day and Date : Saturday, 15-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

1. A) Choose correct alternative (**one** mark **each**) : **7**

1) A simplex in two dimension is _____

a) line b) triangle

c) point d) tetrahedron

2) The boundary points of a convex set are always _____

a) Extreme points b) Interior points

c) Not extreme points d) None of these

3) A quadratic form Q(X) is positive definite iff

a) $X^TQX > 0$ b) $X^TQX \geq 0$ c) $X^TQX < 0$ d) $X^TQX \leq 0$

4) While finding dual of any primal form, all constraints must be in _____ form.

a) $\leq$ b) $\geq$ c) = d) Any of these

5) If the primal problem has unbounded solution, then the dual problem will have _____ solution.

a) Finite solution b) Feasible solution

c) No feasible solution d) Optimum solution

P.T.O.

6) Dual simplex method is applicable to those LPPs that start with

a) an infeasible solution

b) an infeasible but optimum solution

c) a feasible solution

d) a feasible and optimum solution.

7) The set C containing only single point is _____

a) concave b) convex

c) convex hull d) convex polyhedron

B) Fill in the blanks (**one** mark **each**) : **7**

1) If X is just eight vertices of a cube then the convex hull C(X) is _____

2) The element at the intersection of outgoing vector and incoming vector is called _____

3) If CX = Z defines hyperplane, for optimum value of Z this hyperplane is called _____

4) The simplex is an n-dimensional convex polyhedron having exactly _____ vertices.

5) Constructing a Gomory's constraints will mean geometrically that "_____"

6) The net evaluations (Δj' s) corresponding to unit column vectors are always _____

7) Every point on the circumference of the circle is _____

2. a) Define : **3**

i) Feasible solution

ii) Basic solution

iii) Basic feasible solution.

b) P.T. A hyperplane in R^n is a convex set. **4**

c) Obtain the dual of following problem

Min $z = 2x_1 + 3x_2 + 4x_3$

Subject to the constraints,

$2x_1 + 3x_2 + 5x_3 \geq 2$

$3x_1 + x_2 + 7x_3 = 3$

$x_1 + 4x_2 + 6x_3 \leq 5$, $x_1, x_2, x_3 \geq 0$. **3**

d) State the formulas for finding the outgoing and incoming vector in dual simplex method. **4**

3. a) Solve by simplex method

Max $z = 3x_1 + 2x_2$

Subject to the constraints,

$x_1 + x_2 \leq 4$

$x_1 - x_2 \leq 2$ and $x_1, x_2 \geq 0$. **7**

b) Give the algorithm of Dual simplex method. **7**

4. a) P.T. the collection of all feasible solutions to L.P. problem constitute a convex set whose extreme points correspond to the basic feasible solution. **7**

b) Solve the following LPP by using Big-M method.

Max. $Z = -2x_1 - x_2$

Subject to the constraints,

$3x_1 + x_2 = 3$, $4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

and $x_1, x_2 \geq 0$. **7**

5. a) If the k^{th} constraint of the primal is an equality then prove that the dual variable W_k is unrestricted in sign. **7**

   b) The pay off matrix of a game is given. Find the solution of the game to player A and B. **7**

		B				
		I	**II**	**III**	**IV**	**V**
A	**I**	−2	0	0	5	3
	II	3	2	1	2	2
	III	−4	−3	0	−2	6
	IV	5	3	−4	2	−6

6. a) Construct the Kuhn-Tucker conditions for solving a quadratic programming problem. **7**

   b) Give the algorithm of Beale's method to solve a quadratic programming problem. **7**

7. a) Find the optimum integer solution to the following LPP.

   Max $z = x_1 + 2x_2$

   Subject to the constraints,

   $2x_2 \leq 7$

   $x_1 + x_2 \leq 7$

   $2x_1 \leq 11$

   and $x_1, x_2 \geq 0$ and are integers. **8**

   b) Give the computational procedure of finding the solution to LPP by Dual simplex method. **6**
