Programme: MCA	**Max. Time: 3 Hours**
Semester: Third	**Session:2022-23**
Course Title: Data Warehousing and Data Mining	**Max. Marks: 70**

Course Code: SBS CS 01 03 13 E 3003

Instructions:

1. Question no. 1 has seven parts and students need to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student need to answer any two parts of each question. Each part carries seven marks.

Q 1.   **(4X3.5=14)**

a) What are the various data warehousing components?

b) Discuss the Knowledge Discovery Process.

c) What is "Data Dissimilarity"

d) Define "Data Objects"

e) Discuss the various type of correlation.

f) Differentiate between Associate and correlations.

g) What is confusion matrix? How it is related with accuracy?

Unit: I

Q 2.   **(2X7=14)**

a) Describe the various steps of data warehouse building.

b) Write the difference between online analytical processing (OLAP) and online transaction processing (OLTP) in detail.

c) Explain the multidimensional data model by using the suitable example.

Unit: II

Q3.   **(2X7=14)**

a) What is data Visualization? Discuss the tools used for data visualization.

b) Write the short note on following:

- Data Preprocessing
- Cleaning
- Integration
- Reduction & Transformation

c) Describe following:

- Statistical description of Data
- Data Mining Techniques

Unit: III

Q 4.   **(2X7=14)**

a) Calculate the co-efficient of correlation (r) between age of cars and annual maintenance cost by using karl Person's method and comment.

Age of cares in years	2	4	6	7	8	10	12
Annual Maintenance cost in Rs.	1600	1500	1800	1900	1700	2100	2000

b) Find the "**Support**" and "**Confidence**" between Bread and Cookies, Milk and Juice, Cookies and Coffee, Milk and Eggs with the help of following example.

Transaction Id	Transaction Time	Item Bought
101	6:10 am	Milk, Bread, Cookies, Juice
102	7:38am	Milk , Juice
103	8:00pm	Milk , Eggs
104	8:47pm	Bread, Cookies, Coffee

c) Explain the following:
- Pattern Evaluation Methods
- Classification using Frequent Patterns

Unit: IV

Q 5.   **(2X7=14)**

a) What is Cluster analysis? Explain Partitioning, Hierarchical and Density Based Methods.

b) Explain the term "Classification" by taking the example of "Rule Based Classification"

c) Discuss the following:
- Techniques to improve Classification Accuracy.
- Back Propagation.

Programme: Master of Computer Applications(MCA) **Session:** 2022-23
Semester: III **Max. Time:** 3 Hrs
Course Title: Internet and Java Programming **Max. Marks:** 70
Course Code: SBS CS 01 03 21 C 4004

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q1. (4X3.5=14)

a) Define URL class and its methods with the help of an example.

b) Discuss the concept of Sockets at transport layer of TCP/IP Model.

c) Discuss in detail the output of the following program:

```
public class Addtion Byte
{
    public static void main(String[] args)
    {
        byte a = 30;
        byte b = 40;
        byte c = a + b;
        System.out.println("The c variable Value after Addition is : " + c);
    }
}
```

d) Discuss in detail the output of the following program:

In the following code, choose 3 valid data-type attributes/qualifiers among "final, static, native, public, private, abstract, and protected"

```
public interface Status
{
    /* insert qualifier here */ int MY_VALUE = 10;
}
```

e) Explain how interface references can be created by writing a program.

f) Differentiate between throw and throws keywords with appropriate example.

g) Discuss the differences between Java AWT and Java Swing.

Q 2.   (2X7=14)

a) Explain Client-Server communication by writing a suitable program in JAVA.

b) Explain RARP protocol with the help of suitable example.

c) Discuss using program how reliable communication is done by using TCP/IP protocol.

Q3.   (2X7=14)

a) Discuss architecture of Java in Virtual Machine.

b) Demonstrate Multi-dimensional array with the help of suitable example.

c) We have to calculate the area of a rectangle, a square and a circle. Create an abstract class 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters, 'SquareArea' and 'CircleArea' taking one parameter each. The parameters of 'RectangleArea' are its length and breadth, that of 'SquareArea' is its side and that of 'CircleArea' is its radius. Now create another class 'Area' containing all the three methods 'RectangleArea', 'SquareArea' and 'CircleArea' for printing the area of rectangle, square and circle respectively. Create an object of class 'Area' and call all the three methods.

Q 4.   (2X7=14)

a) What is method overriding? Discuss any two rules from the following for method overriding with example

    i.   If the super-class overridden method does not throw an exception, subclass overriding method can only throws the unchecked exception

    ii.   The overriding method must have same return type

    iii.   Overriding abstract methods

b) How constructor chaining is done using this keyword? Explain with suitable example.

c) Discuss Dynamic Method Lookup with a suitable program in JAVA.

Q 5.   (2X7=14)

a) Discuss checked and unchecked exceptions in detail.

b) Explain with example the concept of multithreading.

c) Write a Java Swing program having following functions:

    i.   Create a frame using association inside constructor

    ii.   A button with label "Click Me".

    iii.   A Textfield in which the text "Java Swing" appears as we click on button.

Programme: Master of Computer Application (MCA)   **Session: 2022-23**

Semester: Third   **Max. Time: 3 Hours**

Course Title: Artificial Intelligence and Expert System   **Max. Marks: 70**

Course Code: SBS CS 01 03 19 C 4004

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1.   (4X3.5=14)

    a) Differentiate between Informed Search and Uninformed Search.

    b) What are various applications of Artificial Intelligence.

    c) What do you mean by problem solving in Artificial Intelligence.

    d) Convert the following sentence according to Quantifiers.

        " All man drink tea" (use of Universal Quantifier)

        "Some boys are intelligent" (use of Existential Quantifier)

    e) Explain the architecture of an Expert system.

    f) Explain various approaches and properties of knowledge representation.

    g) What is the importance of Natural Language in AI?

Q 2.   (2X7=14)

    a) Define the BAYE's Theorem. What is the probability that person has disease dengue with neck pain?

        Given: 80 % of time dengue causes neck pain.

        P(dengue) = 1/30,000.

        P(neck pain) = .02

    b) Discuss different properties of search algorithms.

    c) Explain in the detail Branch and Bound Algorithm with appropriate example.

Q3.   (2X7=14)

a) Translate the Following into First Order Logic.

(i) Everyone who sames money earns interest.

(ii) If there is no interest, then nobody saves money.

b) Write AO* algorithm? How AO* algorithm is used for problem reduction? Explain with appropriate example.

c) Explain the Best First Search. Find the search steepest Best First Search for following graph.
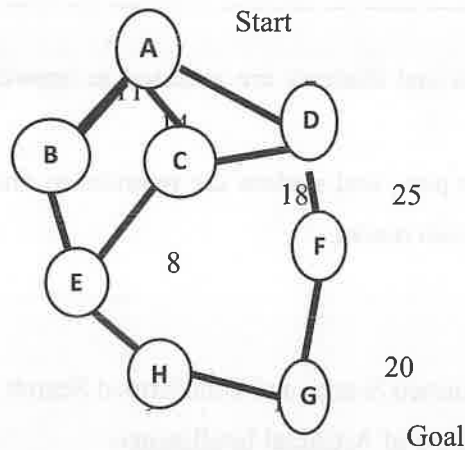
Straight Line Distance

A	B	C	D	E	F	G	H
40	32	25	35	19	17	0	10

Q 4.   (2X7=14)

a) What are the various components of Expert Systems? Explain in detail.

b) Explain the First Order Logic (FOL) in AI.

c) Describe different type of knowledge required to build an expert system.

Q 5.   (2X7=14)

a) Explain the process of Knowledge acquisition and validation.

b) Explain the expert system architecture. And what are the components of Expert Systems.

c) Describe in detail the following (any two)

(i) Problem reduction representation   (ii) Resolution principle

(iii) Decision Trees   (iv) Fuzzy Logic

Programme: MASTER OF COMPUTER APPLICATIONS　　　　　**Session:** 2022-23

Semester: III　　　　　**Max. Time: 3 Hrs**

Course Title: Compiler Design　　　　　**Max. Marks: 70**

Course Code: SBS CS 01 03 18 C 4004

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1.　　　　　　　　　　　　　　　　　　　　　　　　(4X3.5=14)

   a) List the various compiler construction tools.

   b) What does a semantic analyzer do?

   c) What are the problems with top down parsing?

   d) Discuss the working of LEX Tool.

   e) What are the benefits of intermediate code generation?

   f) Give the syntax-directed definition for if-else statement.

   g) What are the properties of optimizing compiler?

Q 2.　　　　　　　　　　　　　　　　　　　　　　　　(2X7=14)

(a) What is Compiler? Explain various phases of compiler with the help of suitable example.

(b) Describe the role of Lexical analyser with the help of suitable diagram.

(c) What do you mean by the term tokens, patterns & lexemes? How Relational operator, Identifier, constants and white spaces are recognized by lexical analyzer?

Q3.　　　　　　　　　　　　　　　　　　　　　　　　(2X7=14)

(a) What is predictive parsing? Explain pre-requisites of predictive parsing with suitable examples.

(b) How to computer First & Follow sets in LL(I) parsing? Computer First & Follow sets for the following grammar:

     S → ABC

     A → a | bbD

     B→ a / ε

     C→ b / ε

     D→ c / ε

(c) Show that the following grammar LR(1) but not LALR(1) by constructing the

parsing table-

S→ Aa |bAc |Bc | bBa

A→ d

B→ d

Q 4.   (2X7=14)

(a) Explain the Static allocation, Stack allocation & Heap allocation with appropriate

example.

(b) What is symbol table? Describe the various data structure used for implementing the

symbol table.

(c) Write Short note on:

(i) Type checking

(ii) Activation record and Activation Tree

Q 5.   (2X7=14)

(a) Explain quadruple, triple and indirect triple and translate the expression

X= - (a + b) * (c + d) + (c + d + e) into quadruple, triple and indirect triple.

(b) Define code optimization? Explain peephole optimization in detail.

(c) Write an algorithm for construction of DAG and construct the DAG with the

following three address code of dot program.

(1)   t1:=4*i

(2)   t2:a[t1]

(3)   t3:=4*i

(4)   t4:=b[t3]

(5)   t5:=t2*t4

(6)   t6:=prod + t5

(7)   prod := t6

(8)   t7 := i+1

(9)   i:= t7

(10)   if i<=20 go to (1)

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1.   (4X3.5=14)

    a) Define how symmetric encryption system differ from asymmetric encryption system.

    b) Differentiate between Host-Based & Network Based IDS.

    c) Discuss the need of security in network communication?

    d) What are the challenges in establishment of secure networks?

    e) Distinguish between a denial-of-service attack and distributed denial-of-service attack?

    f) Use the Caesar Cipher to encrypt and decrypt the message "CENTRALUNIVERSITYOFHARYANA", and the key (shift) value of this message is 3.

    g) Why security of web is necessary to protect data from unauthorized user?

Q 2.   (2X7=14)

    a) Shows how you can encrypt plaintext 5 using the RSA public-key encryption algorithm. Use prime numbers 7 and 11 to generate the public and private keys.

    b) How Digital Signatures are related to Public Key Cryptographic Systems? Discuss the requirements to be fulfilled by digital signature application.

    c) Explain various cryptographics techniques with suitable examples.

Q3.   (2X7=14)

    a) Explain the Network Security Model. What are the Characteristics of information Security?

    b) Discuss various types of intrusions possible in a network system. What are the approaches used for detection of the intrusions?

    c) Discuss different types of Denial of Service attack along with defense mechanism.

Q 4.   (2X7=14)

a) Suppose that two parties A and B wish to set up a common secret key (D-H Key) between themselves using the Diffie Hellman key exchange technique. They agree on 7 as the modulus (q) and 5 as the primitive root (P). Party A chooses 3 and party B chooses 4 as their respective secrets. Their D-H key is ?

b) Explain the NIST Cyber Security Framework.

c) Explain the Algorithms for public key encryption – RSA with suitable example.

Q 5.   (2X7=14)

a) Discuss various types of Firewalls at different layers TCP/IP stack along with their advantages and disadvantages.

b) Define the Caesar Cipher Encryption and Decryption with suitable example.

c) Write short notes on any four of the following:

A) Network security tools,	B) Rootkits,
C) Botnets,	D) Key Loggers,
E) Dealing with unwanted traffic	F) TCP/IP security issues