



**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of Computer Science & Engineering (AI)**

Class Test – I Session: January - June 2023 Month - Apr 2023

**B. Tech. Computer Science & Engineering (AI)**

**Semester: 4<sup>th</sup>**

**CSE (AI)**

**Subject: Discrete Structure**

**Code: B109411(014)**

**Time Allowed: 2 Hours**

**Max Marks: 40**

**Note: - All Questions Compulsory.**

Q. N.	Question	Marks	Levels of Bloom's Taxonomy	COs
Q 1	Define Logical Equivalence. Show that $[p \vee (q \wedge r)] \equiv [(p \vee q) \wedge (p \vee r)]$ .	[2+6]	Remember & Apply	CO1
Q 2	Define Boolean Algebra. Prove De-Morgan's Law Using the Properties of Boolean Algebra.	[2+3+3]	Remember & Apply	CO1
Q 3	Draw the circuit of switching function $[a + (a'b)][a' + (ab)]$ . Simplify the switching function and draw the simplified circuit.	[2+4+2]	Apply	CO1
Q 4	Prove that for two sets A and B (i) $(A \cup B)' = A' \cap B'$ (ii) $(A \cap B)' = A' \cup B'$	[4+4]	Apply	CO2
Q 5	Prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$	[8]	Apply	CO2

# Shri Shankaracharya Institute of Professional Management & Technology

## Department of Computer Science and Engineering (AI)

Class Test – I, Session- March-June 2023, Date-19/4/2023

Sem- B.Tech. 4th Sem CSE(AI), IT

Subject- Database Management System

Time Allowed: 2 hrs.

Max Marks: 40

Note: Solve any two questions from each part.

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
<b>Unit-III</b>				
Q1	List applications and advantages of DBMS.	4	Understanding	CO1
Q2	How do you define instance and schema?	4	Understanding	CO1
Q3	List various types of attributes?	4	Understanding	CO1
Q4	Define weak, strong entity sets and keys.	6	Understanding	CO1
Q5	Explain two tier and three architectures of DBMS.	6	Understanding	CO1
Q6	Explain indexing techniques using B Trees and B+ trees. Consider a B+-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node?	6	Applying	CO2
<b>Unit-IV</b>				
Q7	Define relational database query?	4	Understanding	CO1
Q8	State about SELECTS and PROJECT operation in Relational algebra?	4	Applying	CO2
Q9	Demonstrate how to add a NOT NULL column to a table?	4	Understanding	CO1
Q10	Explain the types of Data model and Relational data model.	6	Understanding	CO1
Q11	Define DDL, DCL, DML.	6	Understanding	CO1
Q12	<p><b>Relational Algebra</b></p> <ul style="list-style-type: none"> <li>• Lives (person-name, street, city)</li> <li>• works(person-name, company-name, salary)</li> <li>• located-in (company-name, city)</li> <li>• Manages (person-name, manager-name)</li> </ul> <p>For the above schema (the primary key for each relation is denoted by the underlined attribute), provide relational algebra expressions for the following queries:</p> <ol style="list-style-type: none"> <li>1. Find all tuples in works of all persons who work for the City Bank company (which is a specific company in the database).</li> <li>2. Find the name of persons working at City Bank who earn more than \$50,000.</li> <li>3. Find the name and city of all persons who work for City Bank and earn more than 50,000. Similar to previous query, except we have to access the lives table to extract the city of the employee. Note the join condition in the query.</li> </ol>	6	Applying	CO2



**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of Computer Science and Engineering (AI)**

Class Test – I, Session- January-June 2023, Date-20/04/2023

Sem- B.Tech.4<sup>th</sup> Sem

Subject- Computer System Architecture

**Time Allowed:2 hrs.**

**Max Marks: 40**

**Note: Solve any five questions out of six.**

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
Q1	Explain the basic block diagram of a computer system. Describe the function of the CPU in a computer system. What is the purpose of the system bus in a computer system?	08	Understanding	CO1
Q2	What are the types of functional units in a computer system architecture explain in brief? How do functional units impact the performance of a computer system?	08	Understanding	CO1
Q3	Explain the concepts of Bus structures and various addressing modes of computer system architecture, also explain the concepts of subroutine.	08	Applying	CO1
Q4	Describe different instruction formats of computer system architecture with suitable example.	08	Understanding	CO1
Q5	Explain the concepts of Sequencing of Control Signals in Computer system architecture.	08	Applying	CO1
Q6	Explain Fetch, Decode and Execution operations of an instructions.	08	Understanding	CO1

**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of Computer Science and Engineering (AI)**

Class Test – I, Session- January-June 2023, Date-20/04/2023

Sem- B.Tech.4<sup>th</sup> Sem

Subject- Computer System Architecture

**Time Allowed:2 hrs.**

**Max Marks: 40**

**Note: Solve any five questions out of six.**

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
Q1	Explain the basic block diagram of a computer system. Describe the function of the CPU in a computer system. What is the purpose of the system bus in a computer system?	08	Understanding	CO1
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**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of CSE (Artificial Intelligence)**

Class Test – I, Session - Jan-June 2023, Month-April

**Sem-CSE(AI) 4<sup>th</sup> Subject- Object-Oriented Programming(with Java) Code- B109413(022)**

Time Allowed: 2 hrs Max Marks: 40

*Note: - Solve Any Five Questions.*

Q. N.	Questions	Marks	Levels of Bloom's taxonomy	COs
1.	Explain the features of Java and Java program structure.	[8]	Understanding	CO1
2.	Write a program in Java to generate the Fibonacci series taking into consideration the following constraints: a) Create a class FIBO b) Class FIBO should have a data member n that will hold the number of terms to be displayed in the Fibonacci series. c) Using the constructor of class FIBO fill the value of n from the user during runtimes. d) A member method named "Series-generate" should be used to generate and display Fibonacci series	[8]	Applying	CO1
3.	a) Specify code written below is correct or not? If yes what will be the output otherwise correct the code : class Test { public static void main(String args[]) { System.out.println(disg()); } int disg() { return 10; } }  b) What is this keyword? Write its uses in java program.	[4+4=8]	Applying	CO1

4.	What is polymorphism? Differentiate between compile time and runtime polymorphism with the help of complete Java Program.	[8]	Understanding	CO2
5.	Explain error handling mechanism? What is difference between checked and unchecked exceptions? Explain with suitable example.	[8]	Understanding	CO2
6.	Write a program that creates an abstract class called dimension, create two subclasses, rectangle and triangle. Include appropriate methods for both the subclass that calculate and display the area of the rectangle and triangle.	[8]	Applying	CO2

20/09/23/AI/Java/S-II



**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of Computer Science and Engineering (AI)**

Class Test – I , Session- January-June 2023

Sem- B.Tech.4<sup>th</sup> Sem

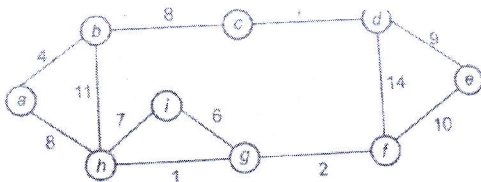
Subject- Design and Analysis of Algorithm

**Time Allowed: 2 hrs.**

**Max Marks: 40**

**Note: Solve any two questions from each part.**

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs											
<b>Unit-I</b>															
Q1	Define various Asymptotic notations and solve the following (a) if $f(n)=2^{2n}$ then select the correct asymptotic relation (1 marks) (i) $O(2^n)$ (ii) $\Theta(2^n)$ (iii) $\Omega(2^n)$ (b) $T(n)=8T(n/2)+3n+2$ solve using Masters theorem.(4 marks)	10	Understanding	CO1											
Q2	Solve the following recurrence relation using iteration method. (a) $T(n)=2T(n/2)+3n^2$ (b) $T(n)=T(n/3)+n^{4/3}$	10	Applying	CO2											
Q3	State insertion sort algorithm and discuss about its best case and worst case analysis. OR Discuss time complexity of heap sort algorithm.	10	Analysis	CO3											
<b>Unit-II</b>															
Q4	State binary Search algorithm using recursion method and calculate its time complexity for best and worst case.	10	Analysis	CO3											
Q5	Write an algorithm to create Huffman code and solve the following using Huffman code method	10	Applying	CO2											
	<table border="1"> <tr> <td>C</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> <td>e</td> <td>f</td> </tr> <tr> <td>f</td> <td>5</td> <td>23</td> <td>10</td> <td>15</td> <td>6</td> <td>41</td> </tr> </table>				C	a	b	c	d	e	f	f	5	23	10
C	a	b	c	d	e	f									
f	5	23	10	15	6	41									
Q6	State Prims algorithm and find out minimum spanning tree for the following graph.	10	Applying	CO2											





Shri Shankaracharya Institute of Professional Management & Technology

Department of Computer Science and Engineering (AI)

Class Test – I, Session- March-June 2023,

Sem- B.Tech. 4th Sem CSE(AI), Subject- Database Management System, Subject Code B109412(022)

Time Allowed: 2 hrs.

Max Marks: 40

Note: Solve any two questions from each part.

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
<b>Section 1</b>				
<b>Part-1</b>				
Q1	Describe applications and advantages of DBMS.	4	Understand	CO1
Q2	Explain instance and schema with example?	4	Understand	CO1
Q3	Describe various types of attributes?	4	Understand	CO1
<b>Part-2</b>				
Q4	Define weak, strong entity sets and keys.	6	Understand	CO1
Q5	Explain two tier and three architectures of DBMS.	6	Understand	CO1
Q6	Solve a B+ tree in which the maximum number of keys in a node is 5. Demonstrate the minimum number of keys in any non-root node? Also explain indexing techniques using B Trees and B+ trees.	6	Apply	CO2
<b>Section-2</b>				
<b>Part-3</b>				
Q7	Define relational database query?	4	Understand	CO1
Q8	Use of SELECTS and PROJECT operation in Relational algebra with example?	4	Apply	CO2
Q9	Explain how to add a NOT NULL column in a table?	4	Understand	CO1
<b>Part-4</b>				
Q10	Explain the types of Data model and Relational data model.	6	Understand	CO1
Q11	Define Data Definition Language (DDL), Data Control Language (DCL), Data Manipulation Language (DML).	6	Understand	CO1
Q12	<b>Solve Relational Algebra</b> <ul style="list-style-type: none"><li>• Lives (person-name, street, city)</li><li>• works (person-name, company-name, salary)</li><li>• located-in (company-name, city)</li><li>• Manages (person-name, manager-name)</li></ul> For the above schema (the primary key for each relation is denoted by the underlined attribute), provide relational algebra expressions for the following queries: <ol style="list-style-type: none"><li>1. Find all tuples in works of all persons who work for the City Bank company (which is a specific company in the database).</li><li>2. Find the name of persons working at City Bank who earn more than \$50,000.</li><li>3. Find the name and city of all persons who work for City Bank and earn more than 50,000. Similar to previous query, except we have to access the lives table to extract the city of the employee. Note the join condition in the query.</li></ol>	6	Apply	CO2





4.	Discuss the polymorphism? Differentiate compile time and runtime polymorphism with the help of complete Java Program.	[8]	Understand + Analyse	CO2
5.	Describe the error handling mechanism and differentiate checked and unchecked exceptions with suitable example.	[8]	Understand + Analyse	CO2
6.	Implement a program that creates an abstract class called dimension, create two subclasses, rectangle and triangle. Include appropriate methods for both the subclass that calculate and display the area of the rectangle and triangle.	[8]	Apply	CO2



**Shri Shankaracharya Institute of Professional Management & Technology**

**Department of Computer Science and Engineering (AI)**

Class Test – I, Session- January-June 2023

Sem- B.Tech.4<sup>th</sup> Sem

Subject- Design and Analysis of Algorithm

Time Allowed: 2 hrs.

Max Marks: 40

Note: Solve any two questions from each part.

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs										
<b>Unit-I</b>														
Q1	Describe various Asymptotic notations and solve the following (a) if $f(n)=2^{2n}$ then select the correct asymptotic relation (1 marks) (i) $O(2^n)$ (ii) $\Theta(2^n)$ (iii) $\Omega(2^n)$ (b) $T(n)=8T(n/2)+3n+2$ solve using Masters theorem.(4 marks)	10	Understanding	CO1										
Q2	Solve the following recurrence relation using iteration method. (a) $T(n)=2T(n/2)+3n^2$ (b) $T(n)=T(n/3)+n^{4/3}$	10	Applying	CO2										
Q3	State insertion sort algorithm and analyze its best case and worst case time complexity. OR Examine time complexity of heap sort algorithm.	10	Analysis	CO3										
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Q4	State binary Search algorithm using recursion method and Examine its time complexity for best and worst case.	10	Analysis	CO3										
Q5	Write an algorithm to create Huffman code and solve the following using Huffman code method	10	Applying	CO2										
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