Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	ESIT-101	Subject Title	DCLD
Mid Semester Test (MST) No.	1	Course Coordinator(s)	Harpreet Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Justify the use of Gray codes in Digital electronics.	CO2, L2	2
Q2	Explain De Morgan's theorem.	CO2, L4	2
Q3	What are Universal gates? Realize following gates using Universal gates a) Ex-OR b) OR	CO3, L3	2+2
Q4	Describe SOP and POS forms? How to convert one form to another.	CO2, L4	4
Q5	Convert following: a) $(218.6)_{10} = (\ )_{16}$ b) $(110100.1101)_2 = (\ )_8$	CO1, L4	2+2
Q6	a) Minimize following Boolean function using K-Map. $f = m(1, 4, 5, 6, 11, 12, 13, 14)$ b) Minimize following Boolean function using Boolean laws $F = AB + (AC)' + AB'C(AB + C)$	CO2, CO3, L5	4+4

Course Outcomes (CO)
Students will be able to

1	To understand and examine the structure of various number systems and its application in digital design
2	Utilize knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits
3	Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms
4	Identify concepts and terminology of digital logic circuits
5	Ability to understand, analyze and design various combinational and sequential circuits
6	To develop skill to build, and troubleshoot digital circuit

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	ESIT-101	Subject Title	DCLD
Mid Semester Test (MST) No.	2	Course Coordinator(s)	Harpreet Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Differentiate Combinational and Sequential circuits.	CO5, L2	2
Q2	Describe Race around condition in JK Flip Flop and How to remove it.	CO5, L4	2
Q3	Explain the working of 4:2 Encoder. Also list the Application areas of Encoder.	CO5, L2	3+1
Q4	Illustrate the need and working of Carry Look ahead Adder.	CO5, L3	4
Q5	What is the difference between Latch and Flip Flop. Design and implement SR Flip Flop.	CO5, L4	2+2
Q6	Design 2 bit Synchronous Up counter using JK flip flop.	CO5, CO6, L5	8

Course Outcomes (CO)
Students will be able to

1	To understand and examine the structure of various number systems and its application in digital design
2	Utilize knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits
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RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology

Program	B.Tech.(IT)	Semester	3rd
Subject Code	PCIT-101	Subject Title	Data Structures
Mid Semester Exam (MSE) No.	1 Aug-Dec, 2023	Course Coordinator(s)	Parminder Kaur Wadhwa
Max. Marks	24	Time Duration	1 hour 30 minutes

Note: Attempt all questions

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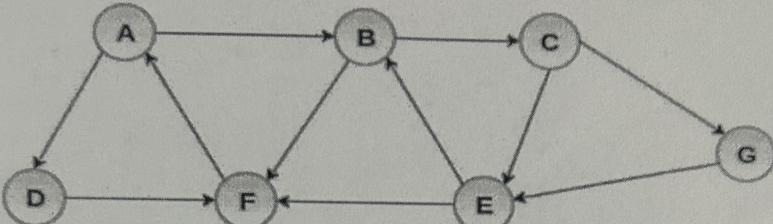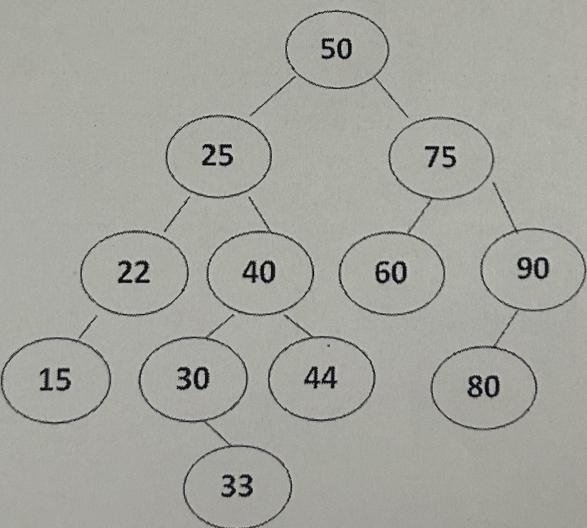| Q. No.	Question	COs, RBT level	Marks
Q.1.	Interpret the efficiency of binary search algorithm.	CO1, L2	2
Q.2.	Create the following circular queue :- | -100 | -2 | | 66 | 90 | 30 |	CO2, L6	2
Q.3.	Illustrate the methods to implement priority queue.	CO2, L3	4
Q.4.	Demonstrate the ways of representing a multidimensional array in the memory of the computer system.	CO3, L3	4
Q.5.	Design a recursive algorithm to solve Tower of Hanoi problem.	CO6, L6	4
Q.6.	Design an algorithm to implement the following linked list:- (i) The node must have "data" part to store information of character data type and "next" part to store the address of the next node. (ii) Create a pointer variable "HEAD" to store the address of the first node. (iii) Insert 'J', 'A', 'M', 'E', 'S', 'B', 'O', 'N', 'D' in Linked list (they must occupy nine different nodes). (iv) Display the content of the linked list to the user.	CO2, L6	8

Course Outcomes (CO) *Students will be able to*

CO1	Analyze and compare algorithms for efficiency using Big-O notation.
CO2	Create and evaluate new algorithms to solve complex engineering problems.
CO3	Illustrate various data structures to solve multi-disciplinary projects.
CO4	Utilize the templates for modularity.
CO5	Compare and classify various data structures
CO6	Demonstrate the reusability of data structures for implementing complex iterative problems

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Program	B.Tech.(IT)	Semester	3rd
Subject Code	PCIT-101	Subject Title	Data Structures
MSE	MSE-2, Aug-Dec, 2023	Course Coordinator	Er. Parminder Kaur Wadhwa
Max. Marks	24	Time Duration	1 hour 30 minutes

Q. No.	Question	COs, RBT level	Marks
Q.1.	Demonstrate how the depth of a Binary Search Tree effects the average running time $f(n)$ to search an item in it (where n are the number of items).	CO1, L3	2
Q.2.	Appraise the efficiency of *open-hashing* as a technique to resolve collision.	CO2, L5	2
Q.3.	Consider the following graph and find the minimum path from Node A to Node E.	CO3, L3	4
Q.4.	Demonstrate the detailed steps of applying the shell sort algorithm to sort the following unsorted list into ascending order (use *Donald Shell's choice* of increment to create shells):- 66, 25, 40, 57, 33, 48, 37, 20	CO6, L3	4
Q.5.	Consider the following AVL search tree. Construct the balanced trees if the following operations are applied one after the other (not independently). (v) Insert 20 (ii) Insert 14 (iii) Insert 88 (iv) Delete 22 (v) Delete 25 (vi) Delete 75	CO3, L6	4
Q.6.	Suppose the table T (circular) has 15. memory locations. T[1], T[2],...T[15] and suppose the File F consists of 11 records; P, Q, R, A, B, C, V, W, X, D, F with the following hash addresses:- Records: P Q R A B C V W X D F H(k): 2 5 6 4 5 4 9 11 14 14 15 Suppose the records are entered into the table T in the above order. Evaluate the efficiency of the given hash function with linear probing as the collision resolution technique. Also judge the efficiency if *chaining* method is used and show the memory organization.	CO2, L5	8

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	PCIT-102	Subject Title	Object Oriented Programming using C++
Mid Semester Test (MSE) No.	2nd	Course Coordinator(s)	Prof. Harjot Kaur Prof. Sachin Bagga
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MSE	9th November, 2023	Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Write C++ program that demonstrates the use of a try-catch block to handle a division by zero error.	CO2, L3	2
Q2	What are the basic steps to open and close a file using file streams in C++.	CO4, L2	2
Q3	Write the output of the following code. Do justify your answer.	CO1, L3	4

```cpp
#include <iostream>
class MyClass {
public:
    static int count;
    int id;
    MyClass() {
        id = count;
        count++;
    }
    void display() {
        cout << "Object with id " << id << " created." << endl;
    }
};
int MyClass::count = 1;
int main() {
    MyClass obj1;
    MyClass obj2;
    MyClass obj3;

    obj1.display();
    obj2.display();
    obj3.display();

    return 0;
}
```

	Elaborate at least four differences between "call by value" and "call by reference"	CO4, L2	4
Q4	Elaborate at least four differences between "call by value" and "call by reference" with reference to the functions used in the program.		
Q5	Design a C++ program that models a basic arithmetic calculator with support for both integer and floating-point numbers. Implement unary and binary operator overloading to enable the calculator to perform operations like addition, subtraction, multiplication, and division on user-provided operands.	CO2, L6	4
Q6	Develop a C++ program to create a simple application for managing different types of vehicles. Define a base class "Vehicle" with attributes like name, speed, and a virtual function "displayInfo" that displays the basic information about the vehicle. Then, derive two classes, "Car" and "Bike," from the base class, each with their own unique attributes and override the "displayInfo" function in each derived class to provide specific information about the vehicle type. In your program's main function, create objects of both the "Car" and "Bike" classes, and use a loop to display the information of each vehicle using the base class pointer.	CO6, CO3, L6	8

Course Outcomes (CO)
Students will be able to

1	Understand the basic concepts of classes, objects and methods as well as basic principles of object-oriented programming.
2	Create object oriented design based on the characteristics of an object-oriented programming language: data abstraction and information hiding, overloading and dynamic binding of the messages to the methods.
3	Apply the concepts of inheritance and relationship among different objects to generate the hierarchies like generalization and aggregation.
4	Investigate the concept of strings, File Handling and Exception handling of Specific Programming Problem
5	Function on a Multi-disciplinary team by using OOPs experiments and Projects.
6	Demonstrate real world applications based on the concepts of OOP in C++..

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	PCIT-102	Subject Title	Object Oriented Programming using C ++
Mid Semester Test (MST) No.	1	Course Coordinator(s)	Pof. Sachin Bagga and Prof. Harjot Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST	27 September 2023	Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	List some practical applications or scenarios where declaring and initializing arrays in C++ would be a beneficial programming approach.	CO6, L2	2

Q2	Given a C++ code snippet:
	int main() {
	   int num1 = 10;
	   int num2 = 0;
	    int result = num1 / num2;
	    std::cout<< "Result: " << result << std::endl;
	    return 0;
	}
	Identify and explain any syntax errors or logical errors that you will find in the code.
		CO1, L3	2

Q3	Elaboratethe principles of structured and object-oriented development impact the efficiency and scalability of software projects in different contexts.	CO1, L2	4
Q4	Develop a code to print a pyramid pattern with user-defined number of rows.	CO1, L6	4
Q5	Examine the significance of member functions within a class. Illustrate your analysis by providing an example in which you thoroughly assess the role of the class's member functions and how they collectively enhance the class's overall functionality.	CO5, L4	4
Q6	Design a menu-driven program that encompasses all functionalities: Sum of Digits and prime number checking. (Make use of concepts like user-defined functions for the stated two tasks, parameter passing)	CO2, L6	8

Course Outcomes (CO)
Students will be able to

1	Understand the basic concepts of classes, objects and methods as well as basic principles of object-oriented programming.
2	Create object-oriented design based on the characteristics of an object-oriented programming language: data abstraction and information hiding, overloading and dynamic binding of the messages to the methods.
3	Apply the concepts of inheritance and relationship among different objects to generate the hierarchies like generalization and aggregation.
4	Investigate the concept of strings, File Handling and Exception handling of Specific Programming Problem
5	Function on Multi-disciplinary team by using OOPs experiments and Projects.
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RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology Aug- Dec 2022

Program	B.Tech.(IT)	Semester	3rd
Subject Code	HSIMT-101	Subject Title	PPLE Section A and B
Mid Semester Test (MST) No.	2	Course Coordinator(s)	Dr. Amit Kamra Dr. Kamaljit Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
1	Distinguish between trademarks and copyrights.	CO1,L1	2
2	Point out the elements of successful technical resume.	CO2,L3	2
3	Write the steps to obtain Patent certificate in India.	CO1,L2	4
4	Describe the Coding Standards for DBMS and Networks.	CO2,L3	4
5	Illustrate various methods to avoid plagiarism.	CO1,L6	4
6	Explain the various types of identity theft. Assume you have made some nice painting and you want to get its copyright. Discuss the procedure of obtaining copyright of this item in India.	CO2,L6 CO3,L6	8

Course Outcomes (CO)
Students will be able to

1	Critically analyze and discuss key characteristics and emerging issues of Professional practice and ethics
2	Articulate and reflect on the industry expectations of competence and conduct in IT related professions.
3	Awareness of types of ethical challenges and dilemmas confronting in IT field
4	Ability to relate ethical concepts and materials to ethical problems in specific professions and professionalism.
5	Interpret and understand the various chapters and sections under Indian IT Act2000
6	Reckon out the need of Intellectual property rights and copyrights

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	MCIT-101	Subject Title	Environmental Sciences
Mid Semester Test (MST) No.	1	Course Coordinator(s)	Prof. Sandeep Kaur Prof. Avneet Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST	25th Sept., 2023	Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Describe an ecological pyramid?	CO1, L2	2
Q2	Examine the point and non-point sources of water and air pollution?	CO2, L5	2
Q3	Explain the concept of ecological footprints through an example.	CO1, L3	4
Q4	Identify the ecosystem services provided by forests?	CO3, L2	4
Q5	Contrast the link between water scarcity and food security.	CO4, L4	4
Q6	(a). 'The automobile is one of the worst inventions made by humankind'. Write your view supporting the statement. (b). Formulate the case study explaining how ecological cycle has got disturbed due to climate change.	CO5, L6	8

Course Outcomes (CO)
Students will be able to

1	Measure environmental variables and interpret results.
2	Evaluate local, regional and global environmental topics related to resource use and management.
3	Propose solutions to environmental problems related to resource use and management.
4	Interpret the results of scientific studies of environmental problems.
5	Describe threats to global biodiversity, their implications and potential solutions.

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3
Subject Code	MCIT-101	Subject Title	Environmental Sciences
Mid Semester Test (MST) No.	2	Course Coordinator(s)	Prof. Sandeep Kaur Prof. Avneet Kaur
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST	6th November 2023	Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Explain environmental ethics?	CO1, L1	2
Q2	Analyze the factors that how an organization can promote sustainable procurement in green computing?	CO2, L4	2
Q3	Describe two major techniques involved in green computing.	CO3, L2	4
Q4	Identify the issues concerning the resettlement and rehabilitation of displaced groups.	CO2, L2	4
Q5	Compare and contrast the impacts of 4G and 5G technology on environment.	CO4, L4	4
Q6	Examine how information technology influences business, society and environment leading to a sustainable triangle.	CO2, L5	8

Course Outcomes (CO)
Students will be able to

1	Measure environmental variables and interpret results.
2	Evaluate local, regional and global environmental topics related to resource use and management.
3	Propose solutions to environmental problems related to resource use and management.
4	Interpret the results of scientific studies of environmental problems.
5	Describe threats to global biodiversity, their implications and potential solutions.

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.	Semester	6
Subject Code	PCIT-103	Subject Title	DCCN
(MST) No.	2	Course Coordinator	Mohanjit Kaur Kang
Max. Marks	24	Time Duration	1hr 30 mins
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	How does the framing of information in media and communication impact people's perceptions and decision-making, and can you provide examples of framing effects in real-world contexts?	CO3, L1	2
Q2	Illustrate variations in the control fields of HDLC frames impact the efficiency and reliability of data transmission in a network, and what strategies could be employed to optimize control field usage for specific network requirements?	CO4, L4	2
Q3	Discuss CSMA/CD.	CO4, L3	4
Q4	Write short note on a) ALOHA b) Ethernet	CO3, CO5, L2	4
Q5	Elaborate how error control and correction codes be effectively applied in the context of modern communication systems.	CO4, L4	4
Q6	Analyze and evaluate the complexities of the Data Link layer in network communication, taking into account all its roles and responsibilities in ensuring seamless data transmission and network performance	CO3, CO4, L5	8

Course Outcomes (CO)
Students will be able to

1	CO1 Understand Network essentials, Network Architecture, TCP/IP and OSI model.
2	CO2 Analyze and solve networking problems in guided and unguided transmission media
3	CO3 Illustrate multi - channel access protocols and IEEE 802standards for LAN and MAN
4	CO4 Contrast the design issues and working of protocols at different layers of TCP/IP and OSI models
5	CO5 Formulate the various congestion and routing algorithms CO6 Implement the concepts of N/W security and protocols such as HTTP, FTP, Telnet, DNS

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Create

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	3rd
Subject Code	HSMIT-101	Subject Title	PPLE for IT Engineers
Mid Semester Test (MST) No.	1	Course Coordinator(s)	Dr. Kamaljit Kaur and Dr. Amit Kamra
Max. Marks	24	Time Duration	1 hour 30minutes
Date of MST	Sept, 2023	Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT Level	Marks
Q1	Specify the general criteria to become a Professional engineer? .	CO1, L2	2
Q2	Is there any benefit of using industry code of practice? Explain.	CO2, L4	2
Q3	Signify the social context of IT and evaluating green computing perforce metrics.	CO4, L1	4
Q4	Elaborate skills required for effective functioning in a team environment.	CO4, L3	4
Q5	Define Ethics ? Differentiate between ethical and legal issues related to IT.	CO3, L4	4
Q6	Discuss as a case study as you get a job of a software professional in IT industry. What role you are playing to a) Develop green IT b) Manage professionalism among team members c) Tackling jealousy and envy among your team members.	CO2, L5 .	8

Course Outcomes (CO)
Students will be able to

1	Critically analyze and discuss key characteristics and emerging issues of Professional practice and ethics.
2	Articulate and reflect on the industry expectations of competence and conduct in IT related professions.
3	Awareness of types of ethical challenges and dilemmas confronting in IT field.
4	Ability to relate ethical concepts and materials to ethical problems in specific professions and professionalism
5	Interpret and understand the various chapters and sections under Indian IT Act 2000
6	Reckon out the need of Intellectual property rights and copyrights.

RBT Classification	Lower Order Thinking Levels (LOTS)	HIGHER ORDER THINKING LEVELS (HOTS)				
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	UNDESTANDING	APPLYING	ANALYZING	EVALUATING	CREATING