



SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-II October-2025

Date: 10/10/2025

Program:	SY B.Tech	Batch:	2024-2028	Semester:	III
Course Code & Name:	UBTML201- Data Structures and Algorithms				
Maximum Marks:	20	Time:	1 Hr		

Course Learning Outcomes:

- To introduce fundamental problem-solving approaches and concepts of data structures and algorithm analysis.
- To provide in-depth knowledge of linked list structures and their operations for dynamic memory management.
- To develop understanding of stack and queue abstract data types along with their applications in expression handling and scheduling.
- To enable learners to analyze and apply basic searching and sorting techniques along with their performance comparisons.
- To impart knowledge about hierarchical and network data structures like trees and graphs and explore their real-world applications.

Instructions:

- All questions are compulsory.
- Assume missing data suitably, if any.
- Draw well labeled diagrams wherever necessary

QUESTIONS		CLO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Write pseudocode to insert a new node at the beginning and at the end of a Singly Linked List.	CLO3	B3	05
B	Draw and explain the structure of a Doubly Linked List showing all pointer connections during deletion at a begin and end.	CLO3	B3	05
C	Explain with an example how a Circular Singly Linked List differs from a normal singly linked list. Mention its advantages.	CLO3	B2	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Perform Binary Search on the sorted array [5, 9, 13, 17, 21, 25, 29, 33] to find the element 21. Show all intermediate steps of low, high, and mid.	CLO4	B3	05
B	Given the array [45, 12, 8, 32, 10], perform Bubble Sort step by step to sort the array in ascending order. Show the result after each pass.	CLO4	B3	05
C	The following list represents student scores: [55, 23, 64, 12, 87, 45, 9]. Sort this list using Merge Sort and explain each divide and merge step clearly.	CLO4	B3	05

*****All the Best*****

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-II October-2025

Program:	SY B.Tech(AI&ML)	Batch :	2023-2027	Semester :	III	Date:	
Course Code & Name:	Python Programming UBTML20/PCC						
Maximum Marks:	20			Time:	1Hr		

Course Learning Outcomes:

1. To learn the fundamentals of the Python programming language.
2. To create a Python list tuple to represent compound data.
3. To write and execute simple as well as complex Python programs.
4. To analyze the concepts of procedural as well as object-oriented Python Programs.
5. To perform files handling operations and handle exceptions using Python.

Instructions:

- All questions are compulsory.
- Assume missing data suitably, if any.
- Draw well labeled diagrams wherever necessary

QUESTIONS		CLO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	What are arrays? Explain Array Representation and Basic Operations On Arrays	CLO3	B1	05
B	Explain The Below Function With Example 1.is_identifier() 2.capitalize() 3.strip() Explain Slicing on string.	CLO3	B2	05
C	Write a Python Program for Binary Search on Integer	CLO3	B3	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Explain the types of function with example?	CLO4	B3	05
B	Explain the Classes and Object with 2 Examples.	CLO4	B3	05
C	Explain the Principles of OOPs concept OR Explain Types of Methods with Example.	CLO4	B2	05

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-II October-2025

Date: 11.10.2025

Program:	SY B.Tech (AI&ML)	Batch	2024-2028	Semester :	III
Course Code & Name:	UBTML0E201 Digital Logic and Microprocessor				
Maximum Marks:	20	Time	1 Hr		

Course Learning Outcomes:

1. Use digital electronics in the present contemporary world.
2. Design various combinational digital circuits using logic gates.
3. Do the analysis and design procedures for synchronous and asynchronous sequential circuits.
4. Use the semiconductor memories and related technology.
5. Identify the architecture and pin configuration of 8086 microprocessor.

Instructions:

- All questions are compulsory.
- Assume missing data suitably, if any.
- Draw well-labeled diagrams wherever necessary

QUESTIONS		CLO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Compare and contrast the following: a) Combinational vs. Sequential Circuits b) Synchronous vs. asynchronous circuits	CLO3	BL4	05
B	Draw and discuss the working S (Set)-R (Reset) latch with a suitable diagram.	CLO3	BL2	05
C	Compare the latches and flip-flops with a suitable diagram and working.	CLO3	BL2	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Discuss the term memory.? How we can classify the types of memory with suitable applications.	CLO4	BL2	05
B	Enumerate the similarities and differences in SRAM and DRAM with diagrams and applications.	CLO4	BL4	05
C	Compare the PAL and PLA with suitable diagrams, working, and applications.	CLO4	BL4	05

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Unit Test-II October-2025

Date: 14/10/2025

Program:	SY B.Tech(AI&ML)	Batch :	2024-2028	Semester :	III
Course Code & Name:	UBTML205/PCC Discrete Structures				
Maximum Marks:	20	Time:	1 Hr		
Course Learning Outcomes:					
<ol style="list-style-type: none"> To familiarize the students with the concepts and techniques of logics & sets. To recognize relations and its real-life application. To comprehend Algebraic structure and its application. To acquire the knowledge of graph theory To acquire the knowledge of trees to understand the concepts of different types of algorithms and its applications that would enhance analytical thinking power. 					
Instructions:					
<ul style="list-style-type: none"> All questions are compulsory. Assume missing data suitably, if any. Draw well labeled diagrams wherever necessary 					

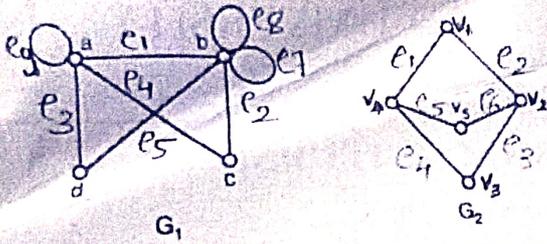
QUESTIONS		CLO	BTL	Marks																
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)																		
A	<p>Let $S = \{a,b,c\}$ and $*$ is a binary operation on S, defined by the table given below :</p> <table border="1"> <tr> <td>$*$</td> <td>a</td> <td>b</td> <td>c</td> </tr> <tr> <td>a</td> <td>b</td> <td>c</td> <td>d</td> </tr> <tr> <td>b</td> <td>c</td> <td>a</td> <td>b</td> </tr> <tr> <td>c</td> <td>a</td> <td>b</td> <td>c</td> </tr> </table> <p>i. Is $*$ a binary operation on S? ii. Is $*$ commutative</p> <p style="text-align: center;">OR</p> <p>Show that set of all +ve Rational numbers form an abelian group under the composition $*$ defined by $a*b = ab/n$</p>	$*$	a	b	c	a	b	c	d	b	c	a	b	c	a	b	c	CLO3	B1	05
$*$	a	b	c																	
a	b	c	d																	
b	c	a	b																	
c	a	b	c																	
B	Show that $\{1,5,7,11\}$ is a group under the multiplication $(a*b)$ modulo 12	CLO3	B2	05																
C	<p>Let $(\{c,d\}, *)$ be a semi group where $c*c=d$. Show that 1. $c*d=c*d$ 2. $d*d=d$</p> <p style="text-align: center;">OR</p> <p>Verify whether $(\mathbb{Z}_8, +)$ forms a group under addition modulo 8, and determine whether it is a cyclic group.</p>	CLO3	B3	05																

Q.2 Attempt the following (Any 2)

Max Marks: 10 (2*5)

A

Find the adjacency and incidence matrix of the following graphs:



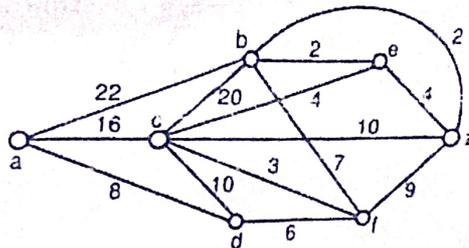
CLO4

B3

05

B

Determine the shortest path between the vertices a and z as shown in the graph below. The numbers associated with the edges are the distance between vertices.



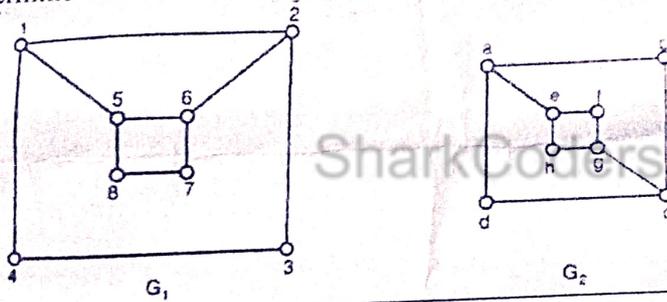
CLO4

B3

05

C

Determine whether the following graphs are isomorphic or not



CLO4

B2

05

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-II October-2025

Date: 15/10/2025

Program:	SY B.Tech (AI&ML)	Batch :	2024-2028	Semester :	III
Course Code & Name:	UBTML206/PCC - Computer Organization and Architecture				
Maximum Marks:	20	Time:	1 Hr		

Course Learning Outcomes:

1. To recognize the components of Computer
2. To articulate the principles of computer organization and the basic architectural concepts
3. To learn simple register transfer language to specify various computer operations
4. To interpret and summarize the pipelining concept and multiprocessor systems
5. To design, and program a simple digital computer ALU operation

Instructions:

- All questions are compulsory.
- Assume missing data suitably, if any.
- Draw well labeled diagrams wherever necessary

QUESTIONS

		CLO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Define the Register Transfer Language (RTL) and why is it important in computer organization?	CLO3	B1	05
B	Explain the concept of shift micro-operations and provide an example.	CLO3	B2	05
C	Perform the following shift operations on register R = 1011 0101: a) Logical shift left by 1, b) Arithmetic shift right by 1, c) Circular shift left by 2	CLO3	B3	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Define the instruction cycle with its stages.	CLO4	B1	05
B	Explain stack organization in a CPU and explain how it works in simple words.	CLO4	B2	05
C	Differentiate between CISC and RISC processors	CLO4	B4	05

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