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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-I September-2025

Date: 08/09/2025

Program:	SY B.Tech (AI&ML)	Batch :	2024-2028	Semester :	III
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Course Code & Name:	UBTML201- Data Structures and Algorithms
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Maximum Marks:	20	Time:	1 Hrs
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- Course Outcomes:**
1. To introduce fundamental problem-solving approaches and concepts of data structures and algorithm analysis.
 2. To provide in-depth knowledge of linked list structures and their operations for dynamic memory management.
 3. To develop understanding of stack and queue abstract data types along with their applications in expression handling and scheduling.
 4. To enable learners to analyze and apply basic searching and sorting techniques along with their performance comparisons.
 5. 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		CO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Explain the general steps involved in problem-solving for software development.	CO1	B2	05
B	Write pseudocode to determine whether a given number is even or odd.	CO1	B3	05
C	Draw a flowchart to check the eligibility criteria for voting in Indian elections.	CO1	B3	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Convert following expression to postfix notation $A + ((B+C) * (D+E))$	CO2	B3	05
B	Show the state of a linear queue after each of the following operations: enqueue(10) enqueue(18) enqueue(50) dequeue() enqueue(70) dequeue() dequeue()	CO2	B2	05
C	Write the pseudocode for stack operations.	CO2	B2	05

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-I September-2025 Date:

Program:	SY B.Tech(AI&ML)	Batch : 2025-2026	Semester :	III
Course Code & Name:	Python Programming UBTML203/PCC			
Maximum Marks:	20	Time:	1 Hrs	

Course Outcomes:

1. To learn the fundamentals of the Python programming language.
2. To create 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.x

Instructions:

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

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QUESTIONS		CO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	What is identifiers ? Write rules for naming valid identifiers with two examples of valid and invalid identifiers.	CO1	B1	05
B	Explain any 5 features of python that make it popular programming language.	CO1	B2	05
C Accept n numbers from the user into a list. Create two separate lists: o One containing all positive numbers o Another containing all negative numbers		CO1 B3 05		
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		

A	<p>Write a Python program to input marks of a student and display the grade using the following constraints:</p> <ul style="list-style-type: none"> • Marks ≥ 90 \rightarrow Grade A • Marks 75-89 \rightarrow Grade B • Marks 50-74 \rightarrow Grade C • Marks < 50 \rightarrow Fail 	CO2	B3	05
B	<p>Explain loop control statements with example. And explain whether the given number is palindrome or not</p>	CO2	B2	05
C	<p>Write a Python program using the math module to demonstrate any five math functions.</p>	CO2	B3	05

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-I September-2025

Date: 9.9.2025

Program:	SY B.Tech CSE -AI& ML	Batch :	2024-2028	Semester:	III
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Course Code & Name:	UBTMLOE201 : Digital Logic and Microprocessor				
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Maximum Marks:	20	Time:	1 Hrs
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Course Outcomes: Students will be able to:

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 labelled diagrams wherever necessary using HB pencil.

QUESTIONS

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Q.1 Attempt the following (Any 2)

	CO	BTL	Marks
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Max Marks: 10 (2*5)			
A	Convert the following: a. $(1101001.110)_2$ to Decimal b. $(1234321)_8$ to Hexadecimal c. Convert 1100 to Gray codes d. Get the 2's complement of 1010101010001111 e. Convert Gray code 1010 to Binary code	CO1	B2 05
B	Minimise the function $F(a,b,c,d) = \sum m(0,2,3,4,6,8,11,14)$ using Karnaugh map and implement with digital logic gates.	CO1	B3 05
C	State and prove DeMorgan's Theorem and illustrate with basic logic gates.	CO1	B3 05

Q.2 Attempt the following (Any 2)

	CO	BTL	Marks
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Max Marks: 10 (2*5)			
A	Design a Full adder Circuit using two half adder circuit	CO2	B5 05
B	Design and discuss the 3 to 8 decoder using 2to 4 decoders.	CO2	B5 05
C	Draw and discuss the Magnitude comparator.	CO2	B2 05

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SCHOOL OF ENGINEERING & TECHNOLOGY

Unit Test-I September-2025

Date: 09/09/2025

Program:	SY B.Tech(AI&ML)	Batch :	2024-2028	Semester :	III
Course Code & Name:	UBTML205/PCC Discrete Structures				
Maximum Marks:	20	Time:	1 Hrs		

Course Outcomes:

- 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:

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

QUESTIONS		CO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Using the laws of propositions , simplify the following expression step by step until you reach its simplest form. $((P \vee Q) \wedge (\neg P \vee R)) \vee (\neg Q \wedge P) \vee (Q \wedge \neg R)$ OR Use Known logical Equivalence to show that $(\neg a \rightarrow b) \wedge ((\neg b \vee (\neg a \vee \neg b)))$ is logically equivalent to $(\neg a \leftrightarrow b)$.	CO1	B1	05
B	Find the Principal Conjunctive Normal Form (PCNF) and Principal Disjunctive Normal Form (PDNF) of the expression: $(P \vee \neg Q) \rightarrow (R \wedge S)$	CO1	B2	05
C	Using Truth Table check whether the following implication is a tautology or not: $((P \wedge Q) \vee (R \rightarrow S)) \Rightarrow ((P \vee R) \rightarrow (Q \vee S))$	CO1	B3	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Let $A = \{1, 2, 3, 6, 12, 24, 36, 64\}$. Define relation R on A by $aRb \Leftrightarrow a$ divides b (i) Prove that R is a partial order relation . (ii) Draw the Hasse diagram of (A,R)	CO2	B3	05

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	(iii) check whether the diagram is a Lattice or not. OR Determine whether the Function F is indeed $\{a,b,c,d\}$ to $\{1,2,3,4,5\}$ with $f(a) = 4, f(b) = 5, f(c) = 1, f(d) = 3$ is one to one function or not			
B	Let $A = \{2,4,6,8,12\}$. Define relation R on A by $aRb \Leftrightarrow \gcd(a,b)$ (i) Represent R as an adjacency matrix . (ii) Draw the digraph representation of R . (iii) Is R symmetric, reflexive, or transitive? Justify.	CO2	B3	05
C	Let $A = \{a,b,c\}$. Define relation $R = \{(a,a),(a,b),(b,c),(c,c),(a,c)\}$. (i) Represent R by a matrix representation . (ii) Represent R by a digraph representation . (iii) Is the relation R is Equivalence Relation or not (iv) find equivalence class of relation R (v) Find Rank of R	CO2	B2	05

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Unit Test-I September-2025

Date: 10/09/2025

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 Hrs		

Course 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		CO	BTL	Marks
Q.1 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Explain the five basic functional units of a computer.	CO1	B1	05
B	Differentiate between Von Neumann and Harvard architecture.	CO1	B2	05
C	Explain the signed number representation? Give an example.	CO1	B3	05
Q.2 Attempt the following (Any 2)		Max Marks: 10 (2*5)		
A	Difference between primary and secondary memory	CO2	B3	05
B	Describe cache coherence? Why is it important in multiprocessor systems?	CO2	B3	05
C	Explain DMA (Direct Memory Access)?	CO2	B2	05

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