DATTA MEGHE COLLEGE OF ENGINEERING

Department of Artificial Intelligence & Data Science

Internal Assessment-II

Academic Year: 2024-25 Semester: ODD

Sub: Engineering Mathematics - III	**Sem: III**	**Year/Div: SE (A & B)**	**Roll No.:**
Time: 1 Hour	**Subject Code: CSC301**		**Total Marks: 20**
Note: Assume data wherever necessary.			

CSC 301.1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
CSC 301.2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
CSC 301.3	Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
CSC 301.4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
CSC 301.5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
CSC 301.6	Understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.

Q.N.	Questions	Marks	CO	BT
1.a	Calculate Karl Pearson's Coefficient of correlation for the following bivariate series. X: 28, 45, 40, 38, 38, 33, 40, 32, 36, 33 Y: 23, 34, 33, 34, 30, 26, 28, 31, 36, 35	05	CSC 301.5	L2
	OR			
1.b	Find Rank coefficient of correlation between heights of father & son. Height of Father: 65, 66, 67, 67, 68, 69, 71, 73 Height of Son: 67, 68, 64, 68, 72, 70, 69, 70	05	CSC 301.5	L2
2.a	Fit a straight line to the following data : $(x, y) = (1, 1), (2, 5), (3, 11), (4, 8), (5, 14)$.	05	CSC 301.5	L3
	OR			
2.b	The equation of two regression lines are $3x + 2y = 26$ & $6x + y = 31$. Find i) means of x and y ii) r iii) σ_y if $\sigma_x = 3$.	05	CSC 301.5	L3
3.a	Find the probability distribution of number of heads(X) obtained when a fair coin is tossed 4 times. Also find its mean.	05	CSC 301.6	L3
	OR			
3.b	Find k, E(X) for the following p.d.f. $f(x) = k(x - x^2), 0 < x < 1$, $k > 0$. Also find V(X).	05	CSC 301.6	L3
4.a	Find a_0 & b_n in the Fourier series of $f(x) = x^2$ on $(0, 2\pi)$	05	CSC 301.3	L4
	OR			
4.b	Obtain Fourier series of $f(x) = 1 + {}^{2x}/_{\pi}$, $-\pi \le x \le 0$ $= 1 - {}^{2x}/_{\pi}$, $0 \le x \le \pi$	05	CSC 301.3	L4

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Department of Artificial Intelligence and Data Science

Internal Assessment - II

Academic Year: 2024-2025 (Semester: Odd)[Second Half (Winter) 2024]

Sub: Data Structure **Semester: III** **Year/Div:SE (A &B)** **Roll No.:**
Time: 1 Hour **Total Marks: 20**
Note: Assume data wherever necessary.

CSC303.1	Students will be able to implement Linear and Non-Linear data structures.
CSC303.2	Students will be able to handle various operations like searching. insertion, deletion and traversals on various data structures.
CSC303.3	Students will be able to explain various data structures, related terminologies and its types.
CSC303.4	Students will be able to choose appropriate data structure and apply it to solve problems in various domains.
CSC303.5	Students will be able to analyze and implement appropriate searching techniques for a given problem.
CSC303.6	Students will be able to demonstrate the ability to analyze, design, apply and use data structures to solve engineering problems and evaluate their solutions.

Q.N.	Question	Mark	CO	BT
1.a	Describe the advantages of link list over the array and application of Link list	05	CSC303.3	L2
	OR			
1.b	Discuss a C program to perform following operations on a singly linked list: i) Delete a node from the given position of the list.	05	CSC303.3	L2
2.a	Build a Binary Search Tree, given the following sequences: Inorder: 35. 41. 48. 52. 57. 72. 79. 85. 86. 90 Preorder: 57, 41, 35, 52, 48, 90, 72, 85, 79, 86	05	CSC303.4	L5
	OR			
2.b	Construct Huffman tree for the letters in the string "structures" and find the Huffman codes for each symbol in the string.	05	CSC303.4	L5
3.a	Explain DFS graph traversal with example.	05	CSC303.5	L2
	OR			
3.b	Explain the various ways to represent graph in the memory with example	05	CSC303.5	L2
4.a	Define and explain Hashing with the help of example.	05	CSC303.6	L2

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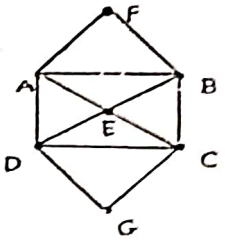
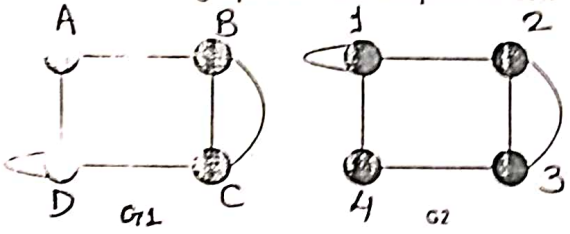
	OR			
4.b	Given the values {91, 82, 43, 37, 69, 24, 61}, a hash table of size 7 and a hash function h(k) = k mod 7, show the resulting table after inserting the values in the given order with Linear probing.	05	CSC303.6	L2

DATTA MEGHE COLLEGE OF ENGINEERING
Department of Artificial Intelligence and Data Science
Internal Assessment – II
Academic Year: 2024-2025 Semester: Odd [Second Half (Winter) 2024]

Sub: Discrete Structure & Graph Theory Semester: III Year/Div: SE (A &B) Roll No.:
Time: 1 Hour Total Marks: 20
Note: Assume data wherever necessary.

CSC302.1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving
CSC302.2	Ability to reason logically.
CSC302.3	Ability to understand relations, functions, Diagraph and Lattice.
CSC302.4	Ability to understand and apply concepts of graph theory in solving real world problems.
CSC302.5	Understand use of groups and codes in Encoding-Decoding
CSC302.6	Analyze a complex computing problem and apply principles of discrete mathematics to identify solutions

Q.N.	Question	Mark	CO	BT
1a	Determine if the following figure has Euler path, Euler circuit. Hamiltonian path and Hamiltonian circuit. 	05	CSC302.4	L4
	OR			
1b	Check whether graphs are Isomorphic or not. 	05	CSC302.4	L4
2a	Explain Lattice and its different types.	05	CSC302.3	L2
	OR			
2b	Hasse diagram for D_{42} and check whether, it is complemented or not.	05	CSC302.3	L2
3a	Solve to find out the solution to the recurrence relation $a_n = 6a_{n-1} + 9a_{n-2}$ with initial conditions $a_0 = 1$ $a_1 = 6$.	05	CSC302.6	L1
	OR			

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Internal Assessment – II

Academic Year: 2024-2025 Semester: Odd [Second Half (Winter) 2024]

3.b	State the Pigeonhole principle with suitable example.	05	CSC302.6	L1
4.a	Consider the (2,5) encoding function. $e : B^2 \rightarrow B^5$ defined as e(00)=(00000) e(01)=(01110) e(10)=(10101) e(11)=(11011). Decode the following words relative to maximum likelihood function. i.11110 ii.10011 iii.10100	05	CSC302.5	L3
	OR			
4.b	Show that the set G = {1,2,3,4,5,6} is a finite Abelian group of order 6 with respect to multiplication modulo 7.	05	CSC302.5	L3

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Department of Artificial Intelligence and Data Science

Internal Assessment - II

Academic Year: 2024-2025 (Semester: Odd) [Second Half (Winter) 2024]

Sub: DLCOA **Semester: III** **Year/Div: SE-A/B** **Roll No.:**
Time: 1 Hour **Total Marks: 20**
Note: Assume data wherever necessary.

CSC 304.1	To learn different number systems and basic structure of computer systems.
CSC 304.2	To demonstrate the arithmetic algorithms.
CSC 304.3	To understand the basic concepts of digital components and processor organization.
CSC 304.4	To understand the generation of control signals of computers.
CSC 304.5	To demonstrate the memory organization.
CSC 304.6	To describe the concepts of parallel processing and different Buses.

Q.N.	Question	Mark	CO	BT
1.a	Differentiate between Hardwired control unit and Micro programmed control unit	05	CSC 304.4	L4
	OR			
1.b	Write a complete micro-program for (i) MUL R1,R2	05	CSC 304.4	L4
2.a	Elaborate cache coherence.	05	CSC 304.5	L5
	OR			
2.b	Consider a 2-way set associative mapped cache of size 16 KB with block size 256 bytes. The size of main memory is 128 KB. Find- 1. Number of bits in tag 2. Tag directory size 3.	05	CSC 304.5	L5
3.a	Explain Flynn's classification	05	CSC 304.6	L2
	OR			
3.b	Describe various Bus Arbitration methods.	05	CSC 304.6	L2
4.a	List & Explain the Characteristics of Memory	05	CSC 304.6	L2
	OR			
4.b	Explain pipelining hazards.	05	CSC 304.6	L2

DATTA MEGHE COLLEGE OF ENGINEERING
Department of Artificial Intelligence and Data Science
Internal Assessment - II
Year: 2024-2025 (Semester: Odd) [Second Half (Winter) 2024]

Sub: Computer Graphics **Semester: III** **Year/Div: SE (A & B)** **Roll No.:**
Time: 1 Hour **Total Marks: 20**
Note: Assume data wherever necessary.

CSC305.1	Describe the basic concepts of Computer Graphics.
CSC305.2	Demonstrate various algorithms for basic graphics primitives.
CSC305.3	Apply 2-D geometric transformations on graphical objects.
CSC305.4	Explore 3-D geometric transformations, curve representation techniques and projections methods.
CSC305.5	Use various Clipping algorithms on graphical objects
CSC305.6	Explain visible surface detection techniques and Animation

Q.N.	Question	Mark	CO	BT
1.a	Demonstrate what are Homogenous coordinates.	05	CSC305.3	L5
	OR			
1.b	Solve and find a transformation of triangle A(1,0) ,B(0,1), C(1,1) by 1.Rotating 45 degrees about origin and then translating one unit in x and y direction.	05	CSC305.3	L5
2.a	Derive window to viewport coordinate transformation.	05	CSC305.4	L3
	OR			
2.b	Given xwmin=ywmin=5, xwmax=ywmax=9, A(4,12) and B(8,8) Find the intersection pint on the window using Liang Barksy Algorithm to clip the line.	05	CSC305.4	L3
3.a	Explain Parallel and Perspective Projection.	05	CSC305.5	L2
	OR			
3.b	Give the properties of Bezier Curve.	05	CSC305.5	L2
4.a	Write a short note on Depth Buffer algorithm.	05	CSC305.6	L2
	OR			
4.b	Write a short note on Animation.	05	CSC305.6	L2