

CHHATTISGARH SWAMI VIVEKANAND
TECHNICAL UNIVERSITY
Department of Computer Science & Engineering
Class Test – II Session- Nov – Dec, 2024 Month-Nov

Sem- CSE 3rd(AI/DS)

Subject Name - Probability and Statistics

Subject-Code-B127371(022)

Max Marks: 40

Min Marks: 14

Time Allowed: 2 hrs

Note: -Part A is compulsory, attempt any questions from B,C and D.

CO3: Solve engineering related problems based on concepts of Joint Probability distribution.

CO4: Use basic concepts of Testing Hypothesis to solve real life related problems.

CO5: Use basic concepts of Analysis of Variance to solve real life related problems.

Q.N.	Questions	Marks	Levels of Bloom's Taxonomy	COs																		
Unit I																						
Q1	If X and Y are two random variables having joint density function $f(x,y) = \begin{cases} \frac{1}{8}(6-x-y); & 0 < x < 2, 2 < y < 4 \\ 0; & \text{otherwise} \end{cases}$ Find (i) $P(X < 1 \cap Y < 3)$, (ii) $P(X + Y < 3)$.	[4]	L4	CO3																		
Q2	From the data given below, calculate the coefficient of rank correlation between X and Y. <table><tr><td>X</td><td>78</td><td>89</td><td>97</td><td>69</td><td>59</td><td>79</td><td>68</td><td>57</td></tr><tr><td>Y</td><td>125</td><td>137</td><td>156</td><td>112</td><td>107</td><td>136</td><td>123</td><td>108</td></tr></table>	X	78	89	97	69	59	79	68	57	Y	125	137	156	112	107	136	123	108	[8]	L4	CO3
X	78	89	97	69	59	79	68	57														
Y	125	137	156	112	107	136	123	108														
Q3	Write the properties of Regression Co-efficients. Calculate linear regression co-efficients from the following: <table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>Y</td><td>3</td><td>7</td><td>10</td><td>12</td><td>14</td><td>17</td><td>20</td><td>24</td></tr></table>	X	1	2	3	4	5	6	7	8	Y	3	7	10	12	14	17	20	24	[8]	L4	CO3
X	1	2	3	4	5	6	7	8														
Y	3	7	10	12	14	17	20	24														
Q4	Using the Karl's Pearson Coefficient of correlation method, Calculate the coefficient of correlation between the age of husband and wife from the following data: <table><tr><td>Age of husband</td><td>35</td><td>34</td><td>40</td><td>43</td><td>56</td><td>20</td><td>38</td></tr><tr><td>Age of wife</td><td>32</td><td>30</td><td>31</td><td>32</td><td>53</td><td>20</td><td>33</td></tr></table>	Age of husband	35	34	40	43	56	20	38	Age of wife	32	30	31	32	53	20	33	[8]	L4	CO3		
Age of husband	35	34	40	43	56	20	38															
Age of wife	32	30	31	32	53	20	33															
Unit II																						
Q1	Using the hypothesis testing for difference between two population proportions, Check A machine produced 20 defective articles in a batch of 400. After overhauling it produced 10 defective in a batch of 300. Has the machine improved? (5% level of significance is 1.96)	[4]	L3	CO4																		

Q2 Explain the hypothesis testing for difference between two population means. A college conducted both day and night classes intended to be identical. Sample of 100 day students yields examination results as under: $\bar{x}_1 = 72.4$ and $s_1 = 14.8$

[8]

L5

CO4

A sample of 200 night students yields examination results as under: $\bar{x}_2 = 73.9$ and $s_2 = 17.9$

Are the two means statistically equal to 10% level is 1.645?

The time taken by workers in performing a jobs by Method I and Method II is given below:

Method I	20	16	26	27	23	22	
Method II	27	33	24	35	32	34	38

[8]

L6

CO5

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly ($F_{0.05}(6,5) = 4.95$)

Q4 Create two-way ANOVA table for the following per hectare yield for 4 varieties of wheat on 3 plots:

[8]

L1

CO5

Plot of land	Yield			
	A	B	C	D
I	3	4	6	6
II	6	4	5	3
III	6	6	4	7



Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
Class Test-2 (July-December 2024)
B. Tech(H)-3rd Semester
Branch: Artificial Intelligence, Data Science

Subject Name: Analysis and Design of Algorithm

Max Marks: 40

Min Marks:14

Subject Code: B127372(022)

Times: 2 hrs

Note: All questions are compulsory

CO 3: Apply Greedy methods to solve the Knapsack problem, Huffman Encoding, Minimum Spanning Tree and Single Source Shortest Path Algorithm.

CO 4: Apply Dynamic programming methods to solve Matrix chain multiplication, Longest Common subsequence and Knapsack Problem, Sum of Subsets, Travelling salesman problem

CO 5: Apply Greedy methods to solve the Knapsack problem, Huffman Encoding, Minimum Spanning Tree and Single Source Shortest Path Algorithm

Q.No.	Questions	Marks	BL	CO
UNIT 3				
1	<p>a Apply Dijkstra algorithm to solve the given graph</p>	8	L3	3
UNIT 4				
2	<p>a Apply the Matrix Chain Multiplication Algorithm to the given matrices and calculate the minimum number of multiplication operations required to solve this. Also, indicate where to place the parentheses $A_1=2*4$, $A_2=4*5$, $A_3=5*6$, $A_4=6*7$, $A_5=7*8$</p> <p>b Analyze the time complexity of Floyd Warshall Algorithm with an example</p>	8	L4	4
UNIT 5				
3	<p>a Create a B-Tree of order 4 using the given elements: 12, 23, 11, 7, 10, 34, 45, 32, 22, 56, 65, 33, 19, 35, 47, 27, 17, 42, 39,</p> <p>b Distinguish between (i) P and NP Class (ii) Randomized algorithm and Approximation algorithm</p>	8	L6	5
		8	L4	5

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Department of Computer Science & Engineering

Class Test – II Session- July – Dec, 2023 Month-Nov

Sem- CSE 3rd(AI)Subject- Computer Organization and Architecture Code-B127373(022)

Time Allowed:2 hrs Max Marks: 40

Note: - (1) Question No. 1(2 marks) is compulsory in section B & C

(2)Attempt any two questions (6 marks) in all the section.

CO1:Understand the memory structure and its basics.

CO2:Understand the basic processing unit, embedded and other large computing systems.

CO3:Understand the basicof Arithmeticoperations performed by the computer and its hardware implementations.

Q. N.	Questions	Ma rks	Levels of Bloom's Taxonomy	COs
Section-A (Unit-III& V)				
Q1	Explain Booth's multiplication with example.	[6]	L ₃	CO3
Q2	Explain Hardware implementation for signed magnitude data.	[6]	L ₃	CO3
Q3	Explain memory mapped I/o and I/o mapped I/o.	[6]	L ₂	CO1
Section-B (Unit-IV)				
Q1	Define associative memory.	[2]	L ₂	CO1
Q2	Explain memory access technique	[6]	L ₂	CO1,CO2
Q3	What is cache coherence problem and how it can be solved.	[6]	L ₄	CO1,CO2
Q4	The acces time of a cache memory is 500ns and that of main memory is 1200ns. It is estimated that 65% of memory requests are for read and remaining 35% for write. The hit ratio for read access is only 0.8. A write through procedure is used. (i) What is the average access time of the system for both read and write requests. (ii) What is the average access time of the system considering only memory read cycle. (iii) What is hit ratio for write cycle.	[6]	L ₅	CO1
Section -C (Unit-V)				
Q1	What is pipelining.	[2]	L ₂	CO2
Q2	Explain DMA and DMA controller with proper block diagram.	[6]	L ₄	CO1,CO2
Q3	What is parallel processing. Explain its types.	[6]	L ₂	CO2
Q4	Explain types of pipelining.	[6]	L ₂ ,L ₄	CO2



CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Department of Computer Science & Engineering

Class Test – II Session- Nov – Dec, 2024 Month-Nov

Sem- CSE 3rd(AI/DS)

Subject-Code-B127374(022)

Subject Name - Discrete Structure

Max Marks: 40

Min Marks: 14

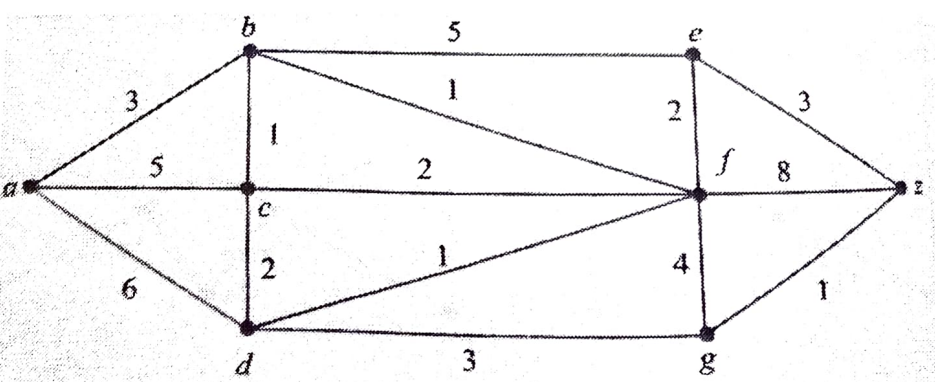
Time Allowed: 2 hrs

Note: -Part A is compulsory, attempt any two questions from B,C and D.

CO3: Solve engineering related problems based on the concept of logical equivalences.

CO4: Use basic concept of graph theory to find the shortest path and distance.

CO5: Use basic concepts of linear congruences to find cryptographic solutions.

Q.N.	Questions	Marks	Levels of Bloom's Taxonomy	COs
Unit I				
✓ Q1	Define logically equivalent statements. For the two statements show that: $p \vee (q \Leftrightarrow r) \equiv (p \vee q) \Leftrightarrow (p \vee r)$	[4]	L2	CO3
✓ Q2	Define quantifier and their types with examples.	[8]	L1	CO3
Q3	State and prove Inclusion-Exclusion principle.	[8]	L4	CO5
✓ Q4	Solve the recurrence relation $a_r - 5a_{r-1} + 6a_{r-2} = 2^r$, given that $a_0 = 1, a_1 = 1.$	[8]	L3	CO5
Unit II				
Q1	Using Dijkstra's algorithm find the shortest path and shortest distance from a to z in the following weighted graph: 	4]	L5	CO4

Q2 Define linear congruence with example. State and prove Fermat's theorem.

[8]

L6

CO5

Q3 Define Chinese remainder theorem. Using Chinese remainder theorem solve the linear congruences:

[8]

L6

CO5

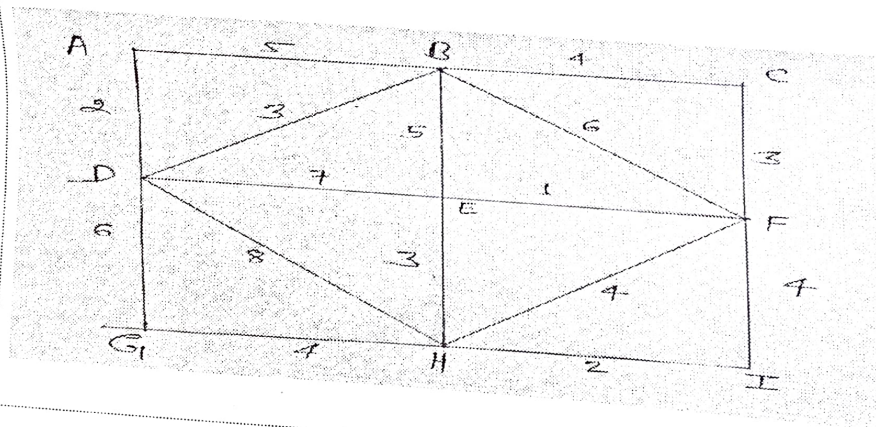
$$x \equiv 5 \pmod{11}, \quad x \equiv 14 \pmod{29}, \quad x \equiv 15 \pmod{31}$$

Q4 Using Kruskal's algorithm to find a minimum spanning tree for the weighted graph given below:

[8]

L5

CO4





Chhattisgarh Swami Vivekanand Technical University
University Teaching Department
Class Test-II (July-December 2024)
B. Tech(H)-3rd Semester
Branch: Artificial Intelligence/ Data Science

Subject Name: Database Management System

Max Marks: 40

Min Marks:14

Subject Code: B127371(022)

Times: 2 hrs

Note: Part A is compulsory.

Attempt any two questions from Part B, Part C, and Part D.

CO 1: Understand fundamental database concepts, DBMS architecture, and the role of entities, relationships, and constraints.

CO 2: Apply relational algebra and calculus, and enforce integrity constraints in relational schema design.

CO 3: Evaluate SQL for database creation, modification, and querying with advanced operations.

CO 4: Creating database design, applying normalization, and storage techniques like indexing and file organization.

CO 5: Apply transaction management, concurrency control, and database recovery techniques.

Q.No.	Questions	Marks	BL	CO
UNIT 3				
1	A Define nested queries?	4	L1	3
	B Write SQL query for following consider table EMP(empno , deptno, ename ,salary, Designation, joiningdate, DOB,city) i) Display employees name and number in an increasing order of salary ii) Display employee name and employee number dept wise iii) Display total salary of all employee iv) Display number of employees dept wise v) Display employee name having experience more than 3 years vi) Display employee name staring with "S" and working in deptno 1002	5	L3	3
	C Consider the following COMPANY database EMP(Name,SSN,Salary,SuperSSN,Dno) DEPT(DNum,Dname,MgrSSN,Dno) DEPT_LOC(Dnum,Dlocation) DEPENDENT(ESSN,Dep_name,Sex) WORKS_ON(ESSN,Pno,Hours) PROJECT(Pname,Pnumber,Plocation,Dnum) Write the SQL queries for the following i)Retrieve the name of the employee who works with same department as ravi ii)Retrieve the number of dependents for an employee "Ravi" iii)Retrieve the name of the managers working in location "DELHI"who has no female dependents iv)List female employees from Dno=20 earning more than 50000 v)List "CSE" department details	5	L3	3
	D By refereeing the following Database schema. Employee(Fname, Minit, Lname, SSN, Bdate, Address, Sex, Salary, Sup_SSN,Dno) Department(Dname, Dnumber, Mgr_SSN, Mgr_Start_date) Dept_Locations(Dnumber, Dlocation) Project(Pname, Pnumber, Plocation, Dnum) Works_On(Essn, Pno, Hours) Dependent (Essn, Dependent_Name, Sex, Bdate, Relationship) Write the SQL Queries for the following	5	L3	3

		(i). Retrieve the name and address of all employees who work for the 'Research' department. (ii). Make a list of all project numbers for projects that involve an employee whose last name is 'Sniith', either as a worker or as a manager of the department that controls the project. (iii). List the names of managers who have at least one dependent. (iv). Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. (v). For each project, retrieve the project number, the project name, and the number of employees who work on that project.			
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UNIT 4

2	A	Given below are two sets of FD's for a relation R(A,B,C,D,E). Are they equivalent? F={A->C, AC->D, E->AD, E->H} and G={A->CD, E->AH}	3	L2	4
	B	Discuss the Primary and Secondary indexes?	5	L3	4
	C	Demonstrate bulk loading of B tree of order 4 with the following data (key*), 56*, 32*, 18*, 72*, 45*, 16*, 98*, 83*, 81*, 27*, 39* 51*, 66*, 44*, 33 *, 22*.	5	L4	4
	D	Consider the relation schema R(A,B,C,D,E,F) and the functional dependencies A->B, C->DF, AC->E, D->F. What is the primary key of this relation R? decompose R into third normal form.	5	L3	4

UNIT 5

	A	List and explain ACID Properties	3	L1	5
3	B	i) Briefly explain two phase locking protocol. ii) Check the following transaction is whether conflict serializable schedule or not. <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> T1 R1(X) R1(Z) </div> <div style="text-align: center;"> T2 R2(Z) R2(Y) W2(Z) W2(Y) </div> <div style="text-align: center;"> T3 R3(X) R3(Y) W3(X) </div> </div>	5	L2	5
	C	Consider timestamping Ordering protocol with the following transactions. T1 (Timestamp=25) T2 (Timestamp=50) T3 (Timestamp=75) <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> R(A) W(C) R (C) </div> <div style="text-align: center;"> R(B) W (B) </div> <div style="text-align: center;"> R(B) W(A) </div> </div> <p>Which transaction will be rollback as per timestamp ordering protocol. Also calculate the new/updated timestamp of each one.</p>	5	L3	5
	D	Write short notes on the query processing and management.	5	L1	5