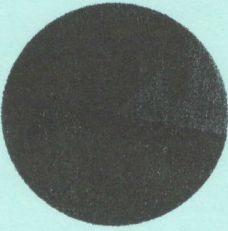
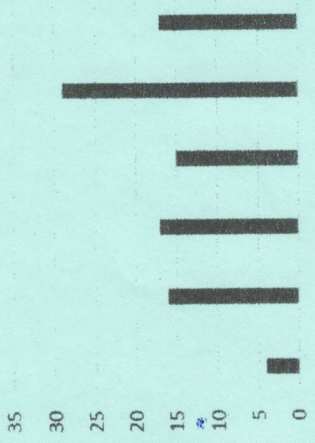


		ARKA JAIN University Jharkhand		NAAC GRADE A ACCREDITED UNIVERSITY		[21-06-2025] END SEM EXAMINATION School of Engineering & IT			
Program		Computer Science & Engineering				Branch B. Tech			
Subject Name		Discrete Mathematics				Session Even, 2024-2025			
Semester		IV				Year June, 2025			
Time: 3 Hour Max. Marks : 70		• Start writing from 2nd page onwards; <u>don't Write on the 1st Page</u> <u>Backside</u> • Answer all Questions of Section A (Compulsory) • Answer any <u>Four</u> out of Six of Section B • Answer Any <u>Three</u> out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material</u>, <u>Arguments with the Invigilator or Discussion with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation</u> of the <u>Paper(s)</u>.							
		Knowledge Level (KL)		K1 : Remembering		K3 : Applying		K5 : Evaluating	
				K2 : Understanding		K4 : Analysing		K6 : Creating	

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)						
Q. N	QUESTIONS		Marks	COs	KL	
i	What is the Cartesian product of two sets $A = \{1,2\}$, $B = \{x,y\}$?		2	CO1	KL1	
ii	Give an example of a binary relation that is symmetric but not transitive.		2	CO2	KL2	
iii	How many 3-digit numbers can be formed from digits 1, 2, 3, 4 without repetition		2	CO2	KL2	
iv	What is the number of permutations of the word "MATH"?		2	CO1	KL1	
v	State the Pigeonhole Principle.		2	CO3	KL3	
vi	What is the difference between a path and a cycle in a graph?		2	CO5	KL5	
vii	What is a planar graph? Give one example.		2	CO2	KL2	
viii	Differentiate between Eulerian path and Hamiltonian path.		2	CO6	KL6	
ix	Define a cyclic group. Give an example.		2	CO5	KL5	
x	State the duality principle in Boolean algebra.		2	CO3	KL3	

Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Prove that the relation R on set $A = \{1,2,3\}$ defined by $R = \{(1,1), (2,2), (3,3)\}$ is an equivalence relation.	05	CO4	KL4
3	Prove that $p \rightarrow (q \rightarrow p)$ is a tautology.	05	CO6	KL6
4	Prove that a tree with n vertices has $(n-1)$ edges.	05	CO3	KL3
5	Prove that the function $f(x)=2x+3$ is bijective on R.	05	CO5	KL5
6	Simplify the following Boolean expressions using Boolean algebra identities: (i) $A \cdot (A+B)$ (ii) $A + (A \cdot B)$	05	CO4	KL4
7	What are the basic logical connectives? Write the truth tables for AND, OR, NOT, IMPLIES, and BICONDITIONAL.	05	CO4	KL
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Using Mathematical Induction, prove that $1+2+3+\dots+n=n(n+1)/2$	10	CO2	KL2
9	Evaluate whether the set $G = \{0, 1, 2, 3, 4, 5\}$ under addition modulo 6 forms a cyclic group. Justify your answer by showing the generators of the group.	10	CO3	KL5
10	Construct the truth table for the compound logical statement: $(P \vee Q) \rightarrow (R \wedge \neg P)$.	10	CO5	KL5
11	Define partial ordering. Give the Hasse diagram for the divisibility relation on the set $\{1, 2, 4, \text{ and } 8\}$.	10	CO5	KL5
12	Define composite function and find fog (3) and gof (3) where, $f(x) = 3x^2 - 1$ and $g(x) = 5-2x$	10	CO6	KL6

Course Outcomes	CO1	CO2	CO3	CO4	CO5	CO6
	For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives	For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference.	For a given a mathematical problem, classify its algebraic structure	For a given a mathematical problem, classify its algebraic structure	Develop the given problem as graph networks and solve with techniques of graph theory	Apply logical reasoning to solve a variety of problems
GRAPHICAL REPRESENTATION						
Bloom's level wise Marks Distribution			Course Outcome wise Marks Distribution			
						

 ARKA JAIN University Jharkhand				[24-06-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Computer Science and Engineering			Branch	B. Tech
Subject Name	Operating Systems			Session	Even, 2024-2025
Semester	IV			Year	June, 2025
Time: 3 Hour Max. Marks : 70					
• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material</u> , <u>Arguments with the Invigilator or Discussion with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result in the Cancellation of the</u> <u>Paper(s).</u>					
Knowledge Level (KL)	K1 : Remembering		K3 : Applying		K5 : Evaluating
	K2 : Understanding		K4 : Analysing		K6 : Creating

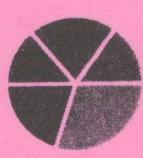
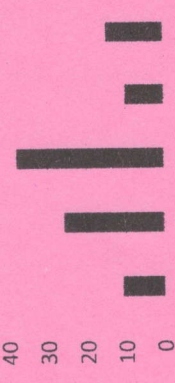
Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)					
Q.N 1	QUESTIONS	Marks	COs	KL	
i	What is process control block?	2	CO1	K1	
ii	What is scheduler?	2	CO1	K1	
iii	What is meant by context switch?	2	CO1	K2	
iv	Distinguish between CPU bounded, I/O bounded processes.	2	CO2	K2	
v	Define CPU Scheduling.	2	CO2	K1	
vi	Distinguish between preemptive and non-preemptive Scheduling.	2	CO2	K2	
vii	Define Deadlock.	2	CO3	K1	
viii	What is resource-allocation graph?	2	CO3	K1	
ix	Define Belady's anomaly?	2	CO3	K1	
x	What is Internal Fragmentation?	2	CO3	K1	

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the various types of system calls with examples.	05	CO1	K2
3	How can deadlock be detected? Explain.	05	CO3	K4
4	Explain about RAID in detail.	05	CO5	K2
5	State critical section problem? Discuss three solutions to solve the critical section problem.	05	CO3	K3
6	Explain the differences between internal fragmentation and external fragmentation.	05	CO3	K4
7	Explain dining philosopher's problem.	05	CO3	K2

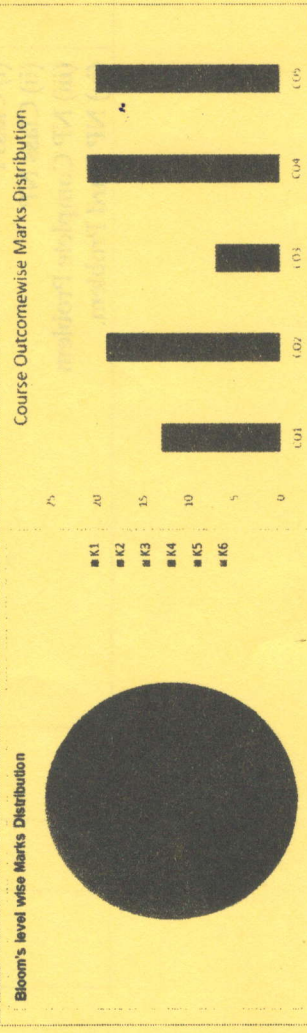
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Compare the functionalities of FCFS, SSTF, C-SCAN and C-LOOK with example.	10	CO5	K4
9	Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use non-preemptive scheduling and base all decisions on the information you have at the time the decision must be made. Process Arrival Time Burst Time P1 0.0 8 P2 0.4 4 P3 1.0 1 Find the average turnaround time and waiting time for these processes with the FCFS scheduling algorithm?	10	CO2	K5
10	Distinguish among short-term, medium-term and long-term scheduling with suitable example.	10	CO2	K4
11	Discuss in detail about file allocation methods. What are the possible structures for directory? Discuss them in detail.	10	CO4	K3
12	Consider the following page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 How many page faults would occur for the following replacement algorithms: FIFO and LRU, assuming three frames that all frames are initially empty?	10	CO3	K5

Course Outcomes	CO1	CO2	CO3	CO4	CO5
	Identify mechanisms to create processes and threads.	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.	For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.	Design and implement file management system.	Develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.
GRAPHICAL REPRESENTATION					
Bloom's level wise Marks Distribution			Course Outcome wise Marks Distribution		
 ■ K1 ■ K2 ■ K3 ■ K4 ■ K5			 ■ CO-1 ■ CO-2 ■ CO-3 ■ CO-4 ■ CO-5		

CO1	Formulate simple algorithms for arithmetic and logical problems.
CO2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms.
CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
CO4	For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems
CO5	For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems

GRAPHICAL REPRESENTATION



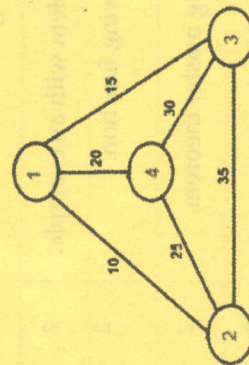
Program	Computer Science & Engineering	Branch	B. Tech
Subject Name	Design and Analysis of Algorithm	Session	Even, 2024-2025
Semester	IV	Year	June, 2025
- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Paper(s)</u>.			
Time: 3 Hour Max. Marks : 70			
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q.N	QUESTIONS	Marks	COs	KL
1				
i	Define an Algorithm. Explain the characteristics of an Algorithm.	2	CO1	K1
ii	Explain DFS with suitable example?	2	CO4	K2
iii	Why do we perform topological sorts only on DAGs? Explain	2	CO2	K3
iv	Differentiate between greedy method and dynamic programming	2	CO3	K3
v	Distinguish between Algorithm and Pseudocode.	2	CO1	K3
vi	What is a Minimum Cost Spanning tree?	2	CO4	K2
vii	Explain the Graph Coloring Problem with an example.	2	CO4	K3
viii	Find the O-notation for the following function. $f(n)=4n^3 + 2n+3$	2	CO1	K5
ix	$T(n)=3.T(n/2)+n^2$, Solve this using master theorem.	2	CO1	K5
x	Define the term Recursion. Give example of a recursive function.	2	CO2	K2

Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the following Asymptotic notations: (i) Big O (ii) Big Ω (iii) Theta Θ	5	CO1	K1
3	Write the algorithm for Binary Search. Apply Binary Search algorithm to find the key value 63 from the given array. 7 14 21 28 35 42 49 56 63 70	5	CO2	K5
4	Solve the 4-Queens Problem by using the Backtracking approach. Draw required state space tree of it.	5	CO5	K6
5	Write a short note on 0/1 Knapsack problem coding.	5	CO3	K2
6	For the given data, find the optimal job sequence and maximum profit using Greedy approach	5	CO4	K5
7	Explain: i) Cook's theorem ii) Non-deterministic algorithms	5	CO5	K2
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Design the Merge Sort algorithm with suitable example. Derive its time complexity.	10	CO3	K6
9	Apply Dynamic Programming to solve the given travelling salesperson problem.	10	CO2	K5
10	Apply Prim's algorithm to obtain a minimum cost spanning tree for the given graph	10	CO4	K5

Job	J1	J2	J3	J4	J5
Profit	60	100	20	40	20
Deadline	2	2	3	1	1



11	Explain the greedy technique for solving the Job Sequencing problem.	10	CO3	K2
12	Explain the following: (i) Class P (ii) Class NP (iii) NP Complete Problem (iv) NP Hard Problem.	10	CO5	K2

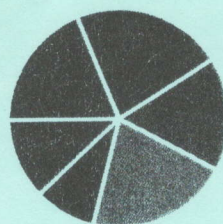
 ARKA JAIN University Jharkhand				[02-07-2025] END SEM EXAMINATION School of Engineering & IT		
Program	Computer Science & Engineering			Branch	B. Tech	
Subject Name	Microprocessor & Microcontroller			Session	Even, 2024-2025	
Semester	IV			Year	June, 2025	
Time: 3 Hour Max. Marks : 70		• Start writing from 2nd page onwards; <u>don't Write on the 1st Page Backside</u> • Answer all Questions of Section A (Compulsory) • Answer Any <u>Four</u> out of Six of Section B • Answer Any <u>Three</u> out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material</u>, <u>Arguments with the Invigilator</u> or <u>Discussion with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.				
		Knowledge Level (KL)		K1 : Remembering		K3 : Applying
		K2 : Understanding		K4 : Analysing		K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)						
Q.N	QUESTIONS	Marks	COs	KL		
i	Write down any two features of the 8051 microcontrollers.	2	CO1	K2		
ii	What is memory-mapped I/O? Give an example.	2	CO2	K1		
iii	Discuss the role of the Stack Pointer in 8086?	2	CO2	K3		
iv	Discuss any two types of addressing modes supported by the 8085 microprocessor.	2	CO1	K1		
v	Write the significance of the Instruction Register in a processor?	2	CO3	K5		
vi	Compare between CALL and JMP instructions in the 8085 microprocessor.	2	CO3	K4		
vii	How is a 7-segment display used to show numeric digits?	2	CO5	K4		
viii	How many byte size instruction is SUB instruction of the 8085 microprocessor and how much T-States it require?	2	CO4	K6		
ix	Write 8085 assembly code to load the accumulator with the contents of memory location 2000H and move it to register B.	2	CO6	K5		
x	What are the main features of the Cortex-M0 debug	2	CO3	K4		

CO1	Learn configuring and using different peripherals in a digital system like I/O, A/D, D/A, timer etc.
CO2	Understand the working of a microprocessor / microcontroller.
CO3	Compile and debug a Program.
CO4	Generate an executable file and use it.
CO5	Evaluating logic of particular dedicated task.
CO6	Develop systems using different microprocessor / microcontrollers

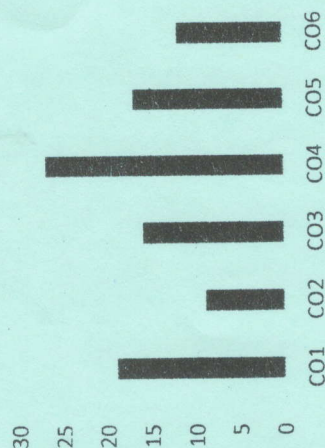
GRAPHICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution



Section B (Answer any FOUR out of SIX) – 20 Marks

(Each question Carry 05 Marks)

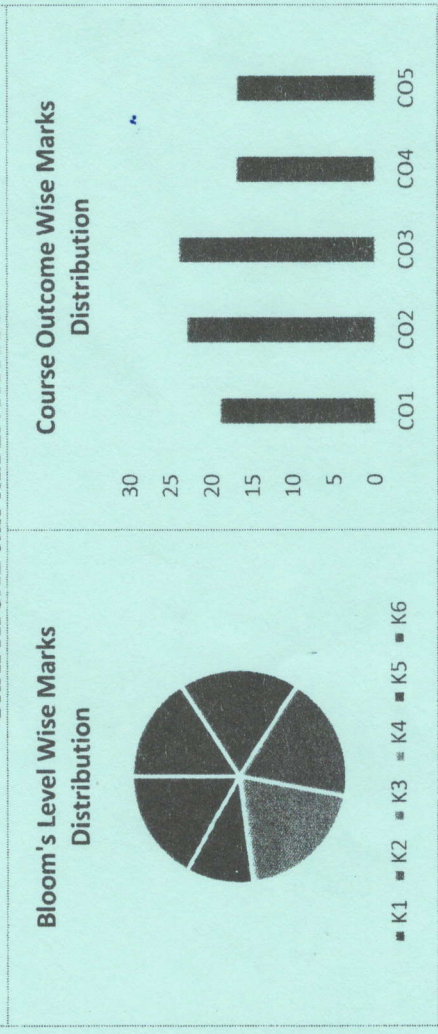
Q. No.	QUESTIONS	Marks	COs	KL
2	Draw and label the pin diagram of the 8085 microprocessor, indicating the purpose of each pin.	5	CO1	K3
3	With examples, analyze various addressing modes supported by the 8085 microprocessor.	5	CO3	K2
4	Draw and explain the timing diagram for the instruction STA 526AH in the 8085 microprocessor.	5	CO5	K5
5	Give comparison between analog and digital sensors with examples.	5	CO2	K1
6	Explain the use of ULN2003 in stepper motor interfacing.	5	CO3	K4
7	Write assembly code to transfer data from memory location 2000H to memory location 3000H using the 8085 microprocessor.	5	CO4	K2

Section C (Answer any THREE out of FIVE) – 30 Marks

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Describe the Cortex-M0 architecture and its key implementation and debug features.	10	CO4	K4
9	Discuss the role of the flag register in the 8085 microprocessor, explaining its various flags and their significance.	10	CO1	K3
10	Explain the architecture of the 8051 microcontroller. Discuss the roles and functionalities of its key registers	10	CO4	K6
11	Write the assembly code for multiplying two 8-bit numbers using the 8085 microprocessor.	10	CO6	K2
12	Write short notes on: LCD LED 7 segment Display LDR	10	CO5	K1

CO- Course Outcomes,		KL- Knowledge Level,	PO – Program Outcome
Course Outcomes	CO1	To gain insights on Excel, version control, Streamlit, R & RStudio and overall development lifecycle in python.	
	CO2	To learn data visualization concepts and practices, enabling effective graphical interpretation of data.	
	CO3	To learn visualization libraries such as Matplotlib and Seaborn to create both basic to advanced visualizations.	
	CO4	Utilize IBM Cognos Analytics proficiently for data analysis and reporting.	
	CO5	To learn basic to advance of Power BI, including the creation of interactive dashboards and reports for real-world data scenarios.	
GRAPHICAL REPRESENTATION			



ARKA JAIN University Jharkhand 		[02-07-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Computer Science & Engineering	Branch	B. Tech
Subject Name	Data Visualization	Session	Even, 2024-2025
Semester	IV	Year	June, 2025
Time: 3 Hour Max. Marks : 70		• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments</u> with the <u>Invigilator</u> or <u>Discussion</u> with <u>Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.	
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)				
Q. N	QUESTIONS	Marks	COs	KL
i	Differentiate between a line chart and an area chart in Excel?	2	CO1	K1
ii	Define power query editor. Which phase of ETL process does the power query editor help in?	2	CO2	K2
iii	Discuss the issues on using a pie chart for comparing multiple categories	2	CO3	K1
iv	Discuss the role of hue in seaborn.	2	CO4	K3
v	How can you use Seaborn and Matplotlib together for enhanced visualizations?	2	CO5	K6
vi	State the difference between absolute and relative cell references in Excel.	2	CO2	K2
vii	Show how to plot a bar chart using Pandas in Python.	2	CO2	K2
viii	Name two Python libraries commonly used for data visualization	2	CO2	K1
ix	How can slicers enhance interactivity in Power BI dashboards?	2	CO1	K3
x	Discuss the role of color theory in visualization?	2	CO3	K2

12	Explain the process and benefits of implementing Row-Level Security (RLS) in Power BI. Provide a scenario where RLS would be essential and describe the steps to configure it in both Power BI Desktop and Power BI Service	10	CO4	K5
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Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain chart junk and its impact on data visualization.	05	CO1	K4
3	Compare and contrast bar charts, line charts, and scatter plots in terms of their use cases.	05	CO2	K4
4	Discuss the use of subplotting in Matplotlib and provide an example of creating multiple plots in one figure.	05	CO3	K6
5	Explain the role of hue, col, and row in Seaborn's sns.relplot().	05	CO5	K1
6	Discuss how misleading visualizations can be used to manipulate public perception. What are the ethical guidelines analysts should follow to ensure fair and accurate data representation?	05	CO3	K3
7	Explain the choice of chart type on data interpretation? Provide examples where a wrong choice of visualization can mislead analysis.	05	CO4	K1
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Analyze the advantages and limitations of using Power BI Service for sharing and collaborating on dashboards and reports as opposed to using Power BI Desktop. Discuss security, version control, and user accessibility in your answer	10	CO1	K4
9	Discuss how you would optimize the performance of a large Power BI report with multiple data sources and complex DAX calculations. Include considerations for data modelling, query reduction, and visualization best practices	10	CO2	K3
10	Raw data often contains missing values and inconsistencies. Explain the impact of uncleaned data on visualizations and describe best practices for data preparation before plotting.	10	CO3	K2
11	When should businesses use static charts, and when should they opt for interactive visualizations? Provide real-world scenarios where interactivity enhances data analysis.	10	CO5	K6

	ARKA JAIN University Jharkhand		[04-07-2025] END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Computer Organization & Architecture	Program B. Tech
Subject Name	Computer Organization & Architecture	Architecture	Session Even, 2024-2025
Semester	IV	IV	Year June, 2025
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Q.N	1	QUESTIONS	Marks	COs	KL
i		Differentiate between the static and dynamic RAM	2	CO2	K2
ii		Explain Instruction formats.	2	CO2	K1
iii		Explain about the data transfer instructions	2	CO3	K4
iv		What is pipelining?	2	CO2	K6
v		What is the importance of having cache memory in a computer system?	2	CO1	K1
vi		What is cache coherence problem?	2	CO1	K2
vii		Perform the arithmetic operations (-65) - (-33) in binary using signed 2's complement representation for negative numbers	2	CO1	K4
viii		Explain interrupt cycle.	2	CO3	K1
ix		Define opcode and offset.	2	CO2	K4
x		Explain the functional units of a computer.	2	CO4	K2

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)

Section B (Answer any FOUR out of SIX) – 20 Marks

(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Name different memory mapping techniques. Explain Associative memory mapping.	05	CO2	K6
3	Explain interconnection between processor and memory with neat diagram.	05	CO4	K2
4	Explain address bus, data bus and control bus.	05	CO3	K4
5	Given a main memory of size 4 GB, a cache of size 1 MB. Find the physical address bits split when the block size is 4kB and word size is 1 Byte. Assume the mapping used is direct memory mapping	05	CO2	K4
6	Explain Flynn's taxonomy in detail	05	CO3	K4
7	A non-pipelined system takes 50 ns to process a task. The same task can be processed in 6 segment pipeline with a clock cycle of 10 ns. Determine approximately the speed-up ratio of the pipeline for 500 tasks.	05	CO4	K6

Section C (Answer any THREE out of FIVE) – 30 Marks

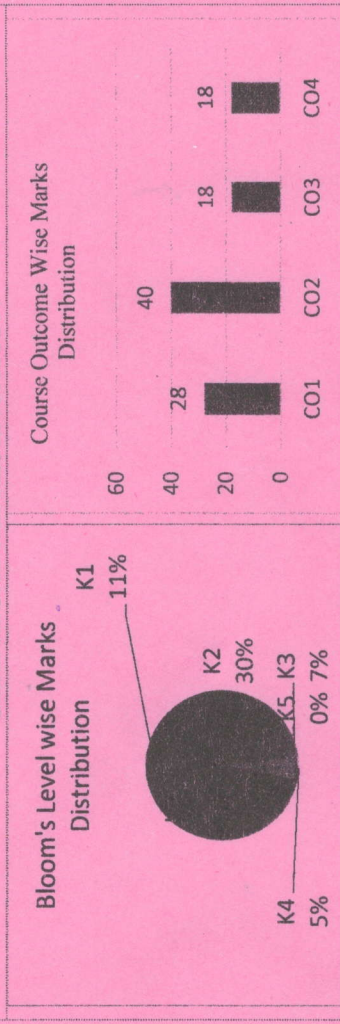
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Perform below multiplication using booth's multiplication algorithm for signed numbers: $3 \times (-7)$	10	CO2	K6
9	Explain cache coherence problem and various software and hardware solutions for it.	10	CO3	K6
10	Describe pipelining with example and diagram. Discuss various pipeline hazards as well.	10	CO2	K5
11	What is the need to implement memory as a hierarchy? Elaborate in detail about the memory hierarchy with neat diagram.	10	CO2	K5
12	Consider a pipeline having 4 phases with duration 60, 50, 90 and 80 ns. Given latch delay is 10 ns. Calculate- a) Pipeline cycle time b) Non-pipeline execution time c) Pipeline time for 1000 tasks d) Speed up ratio e) Throughput	10	CO3	K2

CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

CO1	Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle
CO2	Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
CO3	Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
CO4	Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU

GRAPHICAL REPRESENTATION



 ARKA JAIN University Jharkhand			[04-07-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Computer Science & Engineering		Branch	B. Tech
Subject Name	Relational Database Management System		Session	Even, 2024-2025 ^o
Semester	IV		Year	June, 2025
• Start writing from 2nd page onwards; don't Write on the 1st Page <u>Backside</u> • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).				
Knowledge Level (KL)	K1 : Remembering		K3 : Applying	K5 : Evaluating
	K2 : Understanding		K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x - 20 Marks)					
Q.N	QUESTIONS		Marks	COs	KL
1					
i	What is the need for studying RDBMS, when there are other ways?		2	CO1	K2
ii	What is a data model? Name any two types.		2	CO2	K1
iii	What is the difference between a Candidate key and a Super key?		2	CO2	K2
iv	Differentiate between partial and total participation in ER Diagram.		2	CO2	K2
v	Write any 2 Codd's rule.		2	CO1	K1
vi	Create a Left Join with an example.		2	CO3	K3
vii	What are the applications of Closure property in FD? State any 2.		2	CO4	K2
viii	Differentiate between Concurrent and Serial Schedule in transaction.		2	CO5	K4
ix	When do you say a relation is in 1st NF?		2	CO4	K2
x	List any two constraints used in RDBMS with example.		2	CO1	K1

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Compare and contrast the responsibilities of a database administrator (DBA) and database users in a large-scale database system.	05	CO1	K4
3	List with example any 4 types of problems that may arise due to concurrent execution of transactions.	05	CO5	K2
4	Discuss the challenges and issues in designing an E-R diagram and suggest solutions to overcome them.	05	CO2	K5
5	Consider the relation R (A, B, C, D) with the following functional dependencies: 1. $A \rightarrow B$ 2. $B \rightarrow C$ 3. $A \rightarrow D$ a) Identify the candidate key(s) for the relation R. b) Is the relation R in Third Normal Form (3NF)? Justify your answer	05	CO4	K4
6	Explain the importance of decomposition in database design. What problems can arise from poor decomposition?	05	CO4	K4
7	Differentiate between B and B+ trees. State advantages and disadvantages of each.	05	CO5	K2

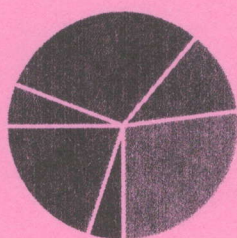
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Demonstrate insertion operation in B Trees. Given the order of B Tree is 5. Insert 5,8,1,3,7,6,4,2,15,21,17,36,48,9,41,16,18,92,87	10	CO5	K3
9	Draw an E-R diagram for a library management system. Include entities, relationships, cardinalities, and constraints. Reduce it to a relational schema.	10	CO2	K6
10	Write complex SQL queries to retrieve data from multiple tables using joins, nested subqueries, and set operations. Include aggregate functions and NULL handling.	10	CO3	K6
11	What is serializability in transaction management? Explain conflict and view serializability with examples.	10	CO5	K4
12	Define and explain the fundamental operations of relational algebra. Illustrate with suitable examples using at least three different operations.	10	CO2	K2

Course Outcomes	CO1	Analyze data organization requirements and their inter relationships.
	CO2	Illustrate the features of data models and their application for storing data.
	CO3	Design queries to maintain and retrieve useful information from the databases created.
	CO4	Analyze the physical database design with respect to their expected performance using normalization and query processing.
	CO5	Examine the best practices according to concepts of indexing, transaction control and concurrency maintenance

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution

