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23/12/2024

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. (CSE)/B. Tech. (Hons.) CSE in AI & ML and DS & ML Semester - III

Course Name: Discrete Mathematics

Course code: BST231

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(10 X

2=20)

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all.

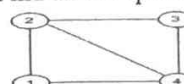
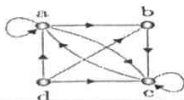
QN	Questions	CO	PO
a.	What do you understand by algebraic structure? Give some examples.	5	1
b.	Differentiate between equivalence relation and partial order relation.	2	1
c.	If $R = \{(1,2), (4,3), (2,2), (2,1), (3,1)\}$ be a relation on $S = \{1,2,3,4\}$, find the reflexive closure.	2	2
d.	Is the given graph a Euler circuit or path? Give reason to support your answer.	3	2
e.	Draw the directed graph that represent the relation $R = \{(1,1), (2,2), (1,2), (2,3), (3,2), (3,1), (3,3)\}$ on $X = \{1,2,3\}$.	2	2
f.	Consider the following relation $R = \{(1,1), (2,2), (2,3), (3,2), (4,2), (4,4)\}$ on $A = \{1,2,3,4\}$. Is R i) Antisymmetric ii) Symmetric		1
g.	What do you understand by chromatic number? Draw the graph having chromatic no 2 and three.	3	1
h.	Distinguish between $\emptyset$, $\{0\}$, $\{\emptyset\}$, 0.	1	1
i.	If $A = \{1,2,3,4,5,6\}$, $B = \{3,6,8,12,17,18\}$, then find $A \cup B$, $A \cap B$, $A - B$	1	2
j.	What do you understand by monoid?	5	1



Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5 X 4=20)

QN	Questions	CO	PO
a.	Find the first five terms of the given recurrence relation $a_k = a^2_{k-1}$, for all integers $k \geq 2$, $a_1 = 12$.	1	1
b.	Find whether the function is onto or not. $f: \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $f(x) = 5x - 9$ for all $x \in \mathbb{Z}$.	2	1
c.	Find the in-degree and out-degree of each vertex of the graph given below.	3	2
d.	What is Abelian group ?	5	1
e.	If $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = x^3 - 4x$, $g(x) = \frac{1}{x^2+1}$, $h(x) = x^4$. Find the following composition functions: i) $hogof(x)$ ii) $fogoh(x)$	2	2
f.	Find all the spanning trees of the graph.	3	2
g.	Draw the Hasse diagram for the divisibility relation on the set $A = \{2,3,6,12,24,36\}$	2	2

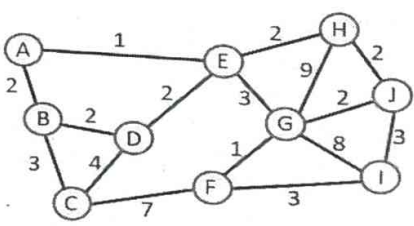


Q.3. Structured Question (Attempt any three out of four)
10=30)

QN	Questions	CO	PO
a.	Using Warshall's algorithm, find all the transitive closure of the relation $R = \{(1,2), (2,3), (3,3)\}$ on the set $A = \{1,2,3,4\}$.	2	
b.	Prove by the method of induction ($n \in \mathbb{N}$). $\frac{1}{3.6} + \frac{1}{6.9} + \frac{1}{9.12} + \dots + \frac{1}{3n(3n+3)} = \frac{n}{9(n+1)}$	1	2
c.	Solve $a_n = a_{n-1} + 6a_{n-2}, n \geq 2$ with initial conditions $a_0 = 1, a_1 = 1$.	1	3
d.	The relation R on a set $A = \{1,2,3,4\}$ is defined by $R = \{(1,1), (1,2), (1,4), (2,2), (2,1), (2,4), (3,3), (3,4), (3,2), (4,2), (4,1)\}$. Find the diagram for R and the matrix M_R .	2	2

Q.4. Long Answer / Essay type (Attempt any two out of three)
15=30)

(2 X

QN	Questions	CO	PO
a.	a.1. Apply Dijkstra's algorithm to the graph and find the shortest path from A to F. a.2. Find out the maximal flow of the given network. 	3	2
b.	Find the minimal spanning tree of the weighted graph using Kruskal's algorithm. 	4	3
c.	$*$ is a binary operation defined on Q. Find which binary operations are commutative and which of them are associative? Also find the identity element, (if it exists) i) $a * b = a + b + ab, a, b \in \mathbb{Z}$ ii) $a * b = a + ab, a, b \in \mathbb{Z}$.	5	2

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. (CSE) Semester – III

Course Name: Discrete Mathematics

Course code: BS301T

Time allotted: 03 Hours

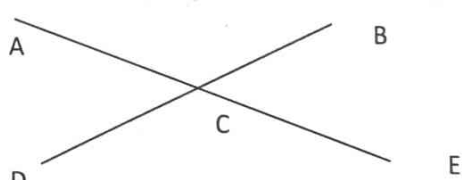
Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(10 X 2=20)

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all.

S. No.	Questions	CO	PO
a.	If $A = \{a, b, c, d\}$ and $B = \{a, c, e, f, g\}$. Then find $A \cap B$.	1	1
b.	Let $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ then calculate $A \wedge B$.	1	1
c.	Write the negation of the following statements He swims if and only if the water is warm.	1	2
d.	Define a rooted tree.	5	1
e.	A nonempty finite poset has a minimal element. (True/False)	3	2
f.	Find the number of distinguishable "words" that can be formed from the letters of PROGRAMMING.	2	11
g.	Define a binary operation.	5	1
h.	Determine whether the following graph has a Hamiltonian circuit, a Hamiltonian path but not a Hamiltonian circuit, or neither. Give reasons for your answer 	4	2
i.	In the poset $(\mathbb{Z}^+,)$, are integers 13 and 17 comparable? Give reason in support of your answer.	3	2
j.	Define an one –one function.	3	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5 X 4=20)

a.	Define the following (i) Abelian Group (ii) Semi- group	5	1
b.	Write the converse and inverse and contrapositive of the following statement If my car is in the repair shop, then I cannot attend the class.	1	2
c.	Define the following (i) Sub graph (ii) Regular graph	4	1
d.	Let $R = \{(a, b), (b, e), (c, d), (d, b), (c, a)\}$ be a relation defined on a set $A = \{a, b, c, d, e, f\}$ Determine if R is a tree, if it is, find the root.	5	3
e.	Let $A = \{1, 2, 3, 4\}$ and $R = \{(2, 1), (2, 3), (3, 2), (3, 3), (2, 2), (4, 2)\}$. Determine the reflexive and Symmetric closures of R .	3	1
f.	Solve the recurrence relation: $b_n = -3b_{n-1} - 2b_{n-2}, b_1 = -2, b_2 = 4$.	2	2
g.	The probability that a new airport will get an award for its design is 0.16, the probability that it will get an award for the efficient use of materials is 0.24, and probability that it will get both awards is 0.11. Find the probability that it will get only one of two awards.	1	1

Q.3. Structured Question (Attempt any three out of four)

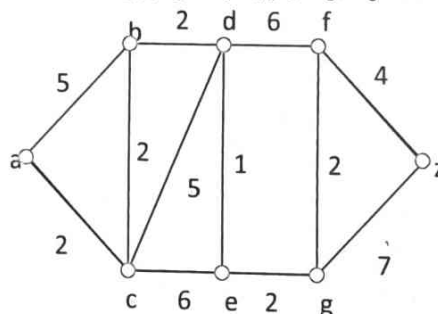
(3 X 10 = 30)

- a. Suppose that 75% of all farmers in a district fertilize their fields, 60% apply herbicides and 35% apply insecticides. In addition, 20% apply none of these, 30% apply all three, 56% apply herbicides and fertilizer, and 33% apply insecticides and fertilizer. Find (4+3+3)
- What percentage apply herbicides and insecticides.
 - What percentage apply herbicides and insecticides but not fertilizer.
 - Construct the Venn diagram and fill all parts of the diagram.
- b. Show that, for every positive integer n , the expression $5^n - 2^n$ is divisible by 3.
- c. (i) Show that $(P(S), \subseteq)$ is a lattice where $P(S)$ is the power set of set S and $\subseteq$ is the set containment. (5)
 (ii) Let $A = \{2, 3, 4, 6, 12, 18, 24, 36\}$. Consider the partial order of divisibility on set A , construct the Hasse diagram of the poset A and find the greatest and least elements. (5)
- d. Suppose that an urn contains 15 balls, of which eight are red and seven are black. In how many ways can five balls be chosen so that
- all five are black,
 - two are red and three are black,
 - at least two are red.

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2 X 15 = 30)

- a. (i) Find the shortest path between the vertices a and z in the following graph by applying Dijkstra's algorithm. (9)



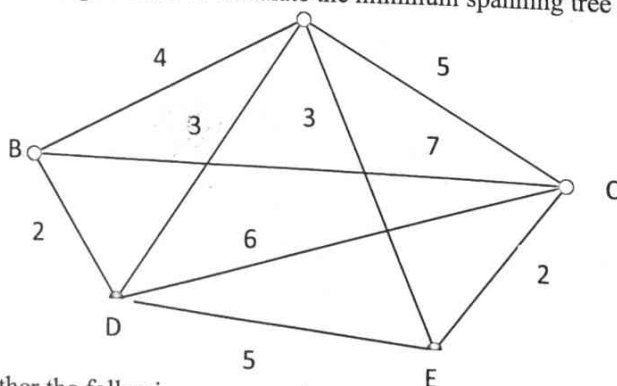
- (ii) Prove the following De Morgan's law (without using Venn diagram)

$$\overline{A \cup B} = \overline{A} \cap \overline{B}$$

- b. Let $A = \{1, 2, 3, 4\}$ and R be a relation on A defined as $R = \{(1, 2), (2, 3), (3, 4), (2, 1)\}$. Compute the transitive closure of R using Warshall's algorithm. (8)

- (ii) Let A be the set of nonzero integers and let the relation on $A \times A$ be defined as $(a, b) R (c, d)$ if and only if $ad = bc$. Determine whether R is an equivalence relation on A . (7)

- c. (i) Apply Kruskal's algorithm's to calculate the minimum spanning tree of the following graph (8)



- (ii) Check whether the following argument is valid or not. (Apply rules of inference)

If the house is next to a lake, then the treasure is not in the kitchen.

If the tree in front yard is a mango tree, then the treasure is in the kitchen.

The house is next to a lake.

The tree in front yard is a mango tree or the treasure is placed behind the mirror in the wall of the study room. If the tree in the backyard is an oak tree, then the treasure is in the drawing room.

$\therefore$ The treasure is placed behind the mirror in the wall of the study room.

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END SEMESTER EXAMINATION, DECEMBER - 2024
B. Tech./B. Tech. (CSE) in AI/DS & ML – Semester - III

Course Name: Computer System Architecture

Course code: CST231

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Attempt All questions. Each carries equal marks.

(10X2=20)

QN	Questions	CO	PO
a.	What is the use of data register?	CO1	PO1
b.	What is meaning of fetch and decode	CO3	PO1
c.	What is computer instruction?	CO1	PO1
d.	Write any two example of Auxiliary memory with working.	CO4	PO1
e.	Write full form of PC and AC.	CO1	PO1
f.	Define virtual memory and paging.	CO4	PO2
g.	What is Stack?	CO2	PO1
h.	What is interrupts in a microprocessor system?	CO5	PO1
i.	What is page fault?	CO4	PO1
j.	What is role of DMA controller?	CO3	PO2

Q.2. Attempt any five questions. Each carries equal marks

(5X4=20)

QN	Questions	CO	PO
a.	Write any five CPU registers and explain their roles.	CO1	PO1
b.	Define "Address Sequence" in the context of computer systems.	CO2	PO1
c.	What is program loops?	CO1	PO2
d.	What is Speedup of a pipeline processing?	CO5	PO1
e.	Elaborate FIFO and LRU page replacement algorithms.	CO4	PO2
f.	What is the deference between machine language and assembly language	CO1	PO1
g.	Explain serial communication.	CO3	PO2

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Q3. Attempt any three questions. Each carries equal marks.

(3X10=30)

QN	Questions	CO	PO
a.	How to understand by pipelining in following terms (i) Arithmetic Pipeline (ii) Instruction Pipeline (iii) Pipeline Conflicts	CO5	PO1
b.	What are the DMA transfer modes? Explain the function of Bus request, bus grant, DMA request and DMA grant. Draw Block diagram of DMA controller.	CO3	PO4
c.	How to understand by Memory Mapping in following terms (i) Direct Mapping (ii) Associative Mapping (iii) Set-Associative Mapping	CO4	PO1
d.	What is Assembler? Explain the first pass with diagram. What is the difference between machine language and assembly language	CO1	PO2

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Q4. Attempt any two questions. Each carries equal marks.

(2X15=30)

QN	Questions	CO	PO
a.	Explain page fault & page replacement techniques. Find the total number of page faults of the following page reference stream using MRU, OPR, and LRU page replacement algorithms and write your comment by comparing them. The frame size is four. Page reference stream: 2 1 2 3 2 1 5 2 1 6 2 5 6 3 1 3 6 1 2 4 3 1 2	CO4	PO2
b.	(i) What von Neumann architecture of computer. Explain all units. (ii) Draw the block diagram of Von Neumann Architecture and explain working.	CO1	PO1
c.	(i) What is the role of Asynchronous Data Transfer? Explain in detail with its types. (ii) What is difference between Asynchronous and synchronous.	CO3	PO2

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END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech./B. Tech. (CSE) in AI/DS & ML – Semester - III

Course Name: Operating System

Course code: CST232

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Attempt All questions. Each carries equal marks.

(10x2=20)

S.No	Questions	CO	PO
a.	Explain difference between Multitasking and Multi Programming?	1	1
b.	Explain briefly concept of virtual machines	1	1
c.	What are the 3 different types of scheduling queues?	1	1
d.	List out the major attributes and operations of a file system.	2	2
e.	Define race condition.	2	1
f.	What are the requirements that a solution to the critical section problem must satisfy?	3	2
g.	Define Starvation in deadlock?	3	2
h.	Define semaphores	2	1
i.	What is Thrashing?	2	1
j.	Define 'Safe State'	4	2

Q.2. Attempt any five questions. Each carries equal marks

(5x4=20)

S.No	Questions	CO	PO
a.	Name and draw five different process states with proper definition.	1	1
b.	Explain the process state transition diagram used in multiprogramming environment. Describe the fields in a process control block (PCB).	1	1
c.	Distinguish between CPU bounded and I/O bounded processes.	1	1
d.	Why is IPC needed? Name the two fundamental models of IPC	1	1
e.	Name any two differences between logical and physical addresses.	3	1
f.	How message passing is used in IPC	2	3
g.	What is the role of scheduler and dispatcher?	3	1

Q3. Attempt any three questions. Each carries equal marks.

(3x10=10)

Questions. Each carries equal marks.												(3x10=10)																																																																																											
S.No	Questions											CO	PO																																																																																										
a.	Consider the following											1	1																																																																																										
	<table><tr><td colspan="4">Allocated</td><td colspan="4">Max</td><td colspan="4">Available</td></tr><tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>A</td><td>B</td><td>C</td><td>D</td><td>A</td><td>B</td><td>C</td><td>D</td></tr><tr><td>P0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>0</td><td>0</td><td>1</td><td>2</td><td>1</td><td>5</td><td>2</td><td>0</td></tr><tr><td>P1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>7</td><td>5</td><td>0</td><td></td><td></td><td></td><td></td></tr><tr><td>P2</td><td>1</td><td>3</td><td>5</td><td>4</td><td>2</td><td>3</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td></tr><tr><td>P3</td><td>0</td><td>6</td><td>3</td><td>2</td><td>0</td><td>6</td><td>5</td><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>P4</td><td>0</td><td>0</td><td>1</td><td>4</td><td>0</td><td>6</td><td>5</td><td>6</td><td></td><td></td><td></td><td></td></tr></table>													Allocated				Max				Available					A	B	C	D	A	B	C	D	A	B	C	D	P0	0	0	1	2	0	0	1	2	1	5	2	0	P1	1	0	0	0	1	7	5	0					P2	1	3	5	4	2	3	5	6					P3	0	6	3	2	0	6	5	2					P4	0	0	1	4	0	6	5	6				
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	P4	0	0	1	4	0	6	5	6																																																																																														
	Answer the following questions using banker's algorithm:																																																																																																						
(i) What are contents of matrix end?																																																																																																							
(ii) Is the system in safe state?																																																																																																							
(iii) If request for process p1 arrives for (0,4,2,0) .Can the request be granted immediately?																																																																																																							
b.	a.	What do you mean by cooperating process?										5	2																																																																																										
	b.	Explain the concept of virtual memory.																																																																																																					
	c.	What is multiprocessor system? Give some advantages.																																																																																																					
c.	a.	Explain solution to producer-consumer problem using semaphores.										2	2																																																																																										
	b.	Explain the difference between long term and short term and medium-term schedulers																																																																																																					
	c.	Explain three main functions of operating system																																																																																																					
d.	a.	What is CIA?										3	3																																																																																										
	b.	Define swapping.																																																																																																					
	c.	List the major dif																																																																																																					
	d.	ference between thread and process.																																																																																																					

Q4. Attempt any two questions. Each carries equal marks.

S.No	Questions																				
a.	Suppose a disk drive has 400 cylinders, numbered 0 to 399. The driver is currently serving a request at cylinder 143 and previous request was at cylinder 125. The queue of pending request in FIFO order is: 86,147,312,91,177,48,309,222,175,130. Starting from the current head position what is the total distance in cylinders that the disk to satisfy all the pending request for each of the following disk scheduling algorithms? (i) SSTS (ii) SCAN																				
b.	(i) Memory partitions of 100kb,500 kb,200 kb,300kb,600 kb is available how would best, worst, first fit algorithm to place processes 212,417,112,426 in order. Which is the best algorithm? (ii) Briefly explain the various kinds of program threats and system threats.	3	1																		
c.	All processes arrived in order p1, p2, p3, p4, p5 all at time zero. <table><tr><th>Process</th><th>Burst time</th><th>Priority</th></tr><tr><td>P1</td><td>10</td><td>3</td></tr><tr><td>P2</td><td>1</td><td>1</td></tr><tr><td>P3</td><td>2</td><td>3</td></tr><tr><td>P4</td><td>1</td><td>4</td></tr><tr><td>P5</td><td>5</td><td>2</td></tr></table> Draw Gant charts illustrating execution of these processes for SJF, non-preemptive priority (smaller priority number implies a higher priority) & round robin(quantum=1) (i) Calculate turnaround time for each process for scheduling algorithm in part (1) (ii) Calculate waiting time for each scheduling algorithm in part (1)	Process	Burst time	Priority	P1	10	3	P2	1	1	P3	2	3	P4	1	4	P5	5	2	4	2
Process	Burst time	Priority																			
P1	10	3																			
P2	1	1																			
P3	2	3																			
P4	1	4																			
P5	5	2																			

Col. No.

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Date 01.01.2025

Regn. No.

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END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech./B. Tech. (CSE) in AI/DS & ML – Semester - III

Course Name: Data Structures

Course code: CST233

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Attempt All questions. Each carries equal marks.

(10x2=20)

S.No	Questions	CO	PO
a.	Differentiate linear and non-linear data structure.	1,2	1
b.	Differentiate BFS and DFS.	4	1
c.	Differentiate space and time complexities of an algorithm.	2	1
d.	Explain the advantages and disadvantages of recursion?	3	1
e.	What do you mean dynamic memory allocation? Compare it with static memory allocation.	1,2	1
f.	Explain PUSH, POP and PEEK operations of stack.	3	1
g.	Differentiate enqueue and dequeue operations?	2	1
h.	Write the applications of stack.	3	1
i.	Mention the different ways of tree traversal.	4	1
j.	Write the applications of queue.	3	1

Q.2. Attempt any five questions. Each carries equal marks

(5x4=20)

S.No	Questions	CO	PO
a.	Write a program to implement sparse matrix.	2	2,3
b.	What is priority queue? How it is implemented?	3	2,3
c.	Write an algorithm to delete a given item from a two way list.	3	2,3
d.	Write algorithm of Enqueue and Dequeue operation of linear queue.	3	2,3
e.	Explain in detail about ordered list and sparse matrix.	1,2	1,2
f.	Write a program to calculate the factorial of a number using recursion.	3	1,2,3
g.	Write a program to pass an array as parameter.	2	1,2,3

Q3. Attempt any three questions. Each carries equal marks.

(3x10=30)

S.No	Questions	CO	PO
a.	What do you mean by AVL tree? Explain all its rotations with example.	4	1,2
b.	Compare BFS and DFS traversal methods for graph with suitable example.	4	1,2
c.	Write an algorithm to evaluate postfix expression. Convert the following infix expression into equivalent postfix expression (a+b)*c-d+e/(f-g)	3	1,2,3
d.	Define a tree. Explain the different types of binary tree. What is predecessor and successor of a node in a binary search tree?	4	1,2

Q4. Attempt any two questions. Each carries equal marks.

(2x15=30)

S.No	Questions	CO	PO
a.	Post-order of a binary search tree is 10, 9, 23, 22, 27, 25, 15, 50, 95, 60, 40, 29. Construct binary search tree.	4	1,2,3
b.	i) Explain circular queue with example and write an algorithm to insert and delete an element from a circular queue. ii) Apply bubble sort on the following elements: {21, 11, 5, 78, 49, 54, 72, 88}	3,5	2,3
c.	i) Write an algorithm to insert an item into a one way list. ii) Construct a B-tree of order 3 by inserting numbers from 1 to 10.	3,4	1,2,3

END SEMESTER EXAMINATION, DECEMBER - 2024**B. Tech./B. Tech. (CSE) in AI & ML – Semester - III****Course Name: Introduction to Artificial Intelligence****Course code: PCT311****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Attempt All questions. Each carries equal marks.****(10x2=20)**

QN	Questions	CO	PO
a.	Define the A* search algorithm.	2	4
b.	What is a heuristic function?	3	5
c.	What are the main goals of AI?	1	3
d.	Define transition nets and augmented transition nets.	4	7.8
e.	Differentiate between weak AI and strong AI.	2	4
f.	What are semantic nets in knowledge representation?	3	5
g.	Define forward and backward deduction in inference systems.	1	3
h.	Explain the concept of fuzzy relations.	4	7
i.	What is approximate reasoning in fuzzy logic?	4	8
j.	What is the purpose of pattern recognition?	4	8

Q.2. Attempt any five questions. Each carries equal marks**(5x4=20)**

QN	Questions	CO	PO
a.	What is machine learning, and how is it related to AI?	2	4
b.	What is machine perception?	3	5
c.	What is the role of natural language processing in AI?	1	3
d.	Compare and contrast greedy best-first search and A* search	4	7.8
e.	Explain the concept of reinforcement learning in AI.	2	4
f.	Describe the key components of knowledge representation	3	5
g.	Explain the operations on fuzzy sets	1	3

Q3. Attempt any three questions. Each carries equal marks.**(3x10=30)**

QN	Questions	CO	PO
a.	Discuss the methods used in speech recognition and their significance in pattern recognition systems.	2	4
b.	Define fuzzy logic and discuss its applications in decision theory and fuzzy controllers.	3	5
c.	Explain the characteristics of an intelligent agent and provide examples of different types of agents.	1	3
d.	What are neural networks? Explain their structure and significance in AI.	4	8

Q4. Attempt any two questions. Each carries equal marks.**(2x15=30)**

QN	Questions	CO	PO
a.	Elaborate on the significance of grammar-free analyzers in sentence generation and translation.	2	4
b.	Compare and contrast the different types of AI approaches: symbolic AI, machine learning, and hybrid AI.	3	5
c.	Explain the operations on fuzzy sets and their role in fuzzy inference logic.	1	3

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. CSE Semester – III

Course Name: Object Modelling Techniques & Java Programming

Course code: CS304T

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type (Very short) Attempt all.

(10×2=20)

a. Define OMT	CO1	PO1
b. Define Link	CO1	PO1
c. Define Association	CO2	PO1,2
d. What is extension in inheritance	CO2	PO1
e. Define State diagram	CO3	PO1,2
f. Define activity diagram	CO3	PO1,2
g. Differentiate between Instance variable and Local variable	CO4	PO1
h. What is a role of static members in JAVA?	CO4	PO1,2
i. Differentiate between List and set	CO4	PO1
j. Write the statement for connection object in JDBC.	CO5	PO1,2

Q.2. Short notes Type (Attempt any five out of Seven)

(5×4=20)

a. Differentiate between objects and classes in the context of object-oriented programming.	CO1	PO1,2
b. Describe the key components of the Object Modeling Technique methodology.	CO1	PO1,2
c. Discuss how inheritance is employed for generalization in object-oriented design, emphasizing its role in creating common base classes.	CO2	PO1,2
d. Prepare a scenario and draw an Event Trace Diagram on "ATM transaction"	CO3	PO1,2,3
e. Write a program to print factorial of a given number. -Use Scanner Class for input -A static and recursive method for logic.	CO4	PO1,2
f. Explain Multithreading	CO5	PO1,2
g. Why it is necessary to handle the exception, Also write a code to handle IOException.	CO4	PO1,2

P.T.O./-

Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a.	(i) Define final (ii) Define Constructor Overloading (i) Differentiate among JDK, JRE and JVM	CO4	PO1,2
b.	Prepare a DFD that shows the purchase order processing system		PO1,2
c.	(i) What is object-oriented process? (ii) Discuss the steps of object-oriented process.		PO1,2
d.	(i) Explain Multiple Inheritance (ii) Write a code to achieve full abstraction		PO1,2,1 2

Q.4. Long Answer type (Attempt any two out of three)

(2×15=30)

a.	Name the method and write the code to perform the following operations in java Swing: i) to get the name of selected item from list box. ii) To check whether the check box is selected or not. iii) To enable/disable the text field.	CO5	PO1,2
b.	(i) Explain Dynamic Model (ii) Discuss State Machine	CO3	PO1,2
c.	Define the following with OMT notations: (i) Role Names (ii) Link Attributes (iii) Ordering (iv) Qualification (v) Aggregation	CO2	PO1,2

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. CSE Semester - III

Course Name: Software Engineering & Project Management Course code: CS302T

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Objectives Type

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)

		CO	PO
a.	CASE stands for (i) Computer-Aided Software Engineering (ii) Control Aided Science and Engineering (iii) Cost Aided System Experiments (iv) None of the mentioned	1	2
b.	_____ is not a fundamental activity for software processes in software development. i) Evolution ii) Design and implementation iii) Validation iv) Verification	1	2
c.	Describe two different strategies used in Black box testing.	1	2
d.	Differentiate between informal and formal reviews in the context of software development.	1	2
e.	Define contract management in the software industry.	1	2
f.	Why do bugs and failures occur in software? (i) Because of Developers (ii) Because of companies (iii) Because of both companies and Developers (iv) None of the mentioned	1	2
g.	What is the advantage of adhering to life cycle models for software?	1	2
h.	Enumerate the attributes of software projects.	1	2
i.	What sets apart a feasibility study from the planning phase?	1	2
j.	Software patch is defined as _____ i) Daily or routine Fix ii) Required or Critical Fix iii) Emergency Fix iv) None of the mentioned	1	2

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)

(5×4=20)

	CO	PO
a. Provide an overview of the various levels within the Capability Maturity Model.	3	2
b. Please elucidate all the stages within the COCOMO model.	3	2
c. From a student's perspective, what challenges do software projects often pose?	2	1
d. What is the role of prototyping in aiding software development?	1	2
e. Elaborate on the traits of the Waterfall model in software development.	2	1
f. Can you detail software engineering as a layered technology?	3	2
g. Define and explain the concept of cost-benefit analysis.	3	2

P.T.O./-

Q.3. Structured Question (Attempt any three out of four)

(3)

		CO	
a.	Provide a brief overview of EVA and SQA.	2	2
b.	(i) Justify why validation testing is needed? (ii) Explain the importance of DFD in software designing.	2	2
c.	(i) State software maintenance and briefly describe its various categories. (ii) What does the scope of software engineering encompass?	2	2
d.	(i) Differentiate between top down and bottom-up design strategies. (ii) Define error tracking in software development	2	2

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

		CO	PO
a.	(i) What tools and methodologies are frequently used in software design engineering, such as UML, design patterns, or agile design practices? (ii) Outline the key features of the Waterfall model in software development	5	3
b.	(i) What are the typical phases or iterations in an incremental process model, and how are they structured? (ii) Provide definitions for cohesion and coupling in software engineering.	5	2
c.	Suppose a software development project consists of four components: Front-end: 6,000 lines of code Back-end: 8,500 lines of code Analytics module: 7,200 lines of code Security module: 5,300 lines of code Calculate the total project cost if the productivity of each developer is 900 lines of code per month, and the monthly salary for each developer is \$2,000.	5	3

END SEMESTER EXAMINATION, DECEMBER - 2024

B. Tech. (CSE) Semester - III

Course Name: Computer System Architecture

Course code: CS301T

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Attempt All questions. Each carries equal marks. (10X2=20)

a.	Define the bus and its types.	CO1	PO1
b.	DRAM stands for.....	CO5	PO2
c.	What is a compiler?	CO5	PO1
d.	List out the phases of the instruction cycle.	CO2	PO1
e.	Define LRU.	CO5	PO3
f.	Define program loop.	CO2	PO1
g.	MIMD stands for.....	CO3	PO1
h.	Define priority interrupt.	CO4	PO2
i.	What is page fault?	CO5	PO1
j.	Explain data transfer instructions.	CO2	PO1

Q.2. Attempt any five questions. Each carries equal marks (5X4=20)

a.	Explain instruction and the instruction cycle with the help of the diagram.	CO2	PO1
b.	Write about the data manipulation instructions with an example.	CO1	PO1
c.	Define the pipeline and explain the concept of the arithmetic pipeline and instruction pipeline.	CO3	PO2
d.	What is DMA and explain the concept of DMA controller & data transfer modes.	CO4	PO2
e.	Describe the control unit.	CO2	PO1
f.	Explain FLYNN's classification of computers.	CO2	PO1
g.	Define assembler and differentiate between assembly language & machine language.	CO3	PO1

Q3. Attempt any three questions. Each carries equal marks. (3X10=10)

a.	Describe the microprogrammed control organization. Explain it using a neat diagram. Draw and explain the flowchart of the addition-subtraction of fixed point signed magnitude numbers.	CO2	PO2
b.	Explain arithmetic and logic microoperations. Explain all the shift micro-operations. Apply Left Shift, Arithmetic Right Shift, Circular Left, and Circular Right Microoperations on 100101.	CO1	PO1
c.	What is assembly language code? Explain zero address, one address, two addresses, and three address machine instructions. Write the assembly code for the expression C=A+B using all address machines separately.	CO3	PO2
d.	What is stored program architecture? Explain Von Neuman's Architecture of the computer with a block diagram. List out CPU registers and the role of PC, AC, and IR registers.	CO3	PO1

Q4. Attempt any two questions. Each carries equal marks. (2X15=30)

a.	What is DMA, explain the concept of a Direct Memory Access (DMA) controller with a suitable diagram. Describe the components and operation of a DMA controller. Explain the function of BUS grant, BUS request, DMA request, and DMS ACK.	CO4	PO1
b.	Elaborate memory hierarchy with a neat diagram. Explain cache memory, cache hit, miss, and hit ratio. Consider a 32-bit physical address, where the size of cache memory is 1 MB and the size of the cache block is 128 B, and compute the number of tag bits, if 4-way set associative mapping is used.	CO5	PO2
c.	What is page fault and how demand paging is different from swapping? Explain. Find the total number of page faults of the following page reference stream using LRU, MRU, and OPR page replacement algorithms and write your comment by comparing them. The frame size is three. Page reference stream: 3 1 2 3 2 2 5 2 1 5 2 5 6 3 1 3 6 1 2 4 3 1 2 3 4 5 6	CO1	PO1
