



Academic year 2024-2025 (ODD Sem)

DEPARTMENT OF
INDUSTRIAL ENGINEERING & MANAGEMENT

Date	07 January 2025	Maximum Marks	10 + 50
Course Code	HS251TA	Duration	120 Min
Sem	V	CIE – II	
PRINCIPLES OF MANAGEMENT AND ECONOMICS			

Note: Answer all the Questions.

Sl. No.	Questions	M	BT	CO
Part – A				
1	_____ plans are specifically designed to meet the needs of a unique situation	01	1	1
2	Creating or changing the organization structure is called _____	01	1	1
3	Identify the Quadrant of the BCG Matrix which represents high market share and high market growth.	01	1	1
4	_____ planning bridges the gap between strategic goals and operational tasks.	01	1	2
5	_____ refers to how standardized an organization's jobs are and the extent to which employee behaviour is guided by rules and procedures.	01	1	1
6	A rigid, tightly controlled structure, characterized by high specialization is a characteristic of _____ organization.	01	1	2
7	Draw the circular flow diagram with reference to microeconomics.	02	1	4
8	The rate of increase in prices over a given period of time is defined as _____	01	1	4
9	The _____ measures the change in prices paid by consumers for goods and services.	01	1	5
Part – B				
1	Many companies have a goal of becoming more environmentally sustainable. One of the most important steps they can take is controlling E- waste. You've been put in charge of creating a program to do this for your company to develop plans. Describe your plans in terms of being: (a) Strategic and operational. (b) Short term and long term.	10	2	2
2	Bring out the ways in which a firm could be organized for smooth functioning. How the Chain of command and Span of control does affect the efficient functioning of the firm.	10	2	2
3	An organization should be viewed as a unified, purposeful system composed of interrelated parts. Illustrate using food industry as an example.	10	4	1
4	Will the firms in an oligopoly act more like a monopoly or more like competitors? Briefly explain with suitable example.	10	3	4
5	A rapidly developing country has hired you to present a specific strategy for keeping their inflation and unemployment rates low while maintaining a healthy rate of GDP growth. Explain in detail the components of GDP that can be used to accomplish this.	10	3	4

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5	L6
	Quiz	Max Marks	04	02	-	3	1	10	-	-	-	-	-
	Test		10	20	-	20	-	-	20	20	10	-	-



R V College of Engineering
Department of Computer Science and Engineering
CIE - II: Question Paper

**Subject :
(Code)**

Database Management Systems (CD252IA)

Semester : 5TH BE

Date :07/01/2025

Duration : 120 minutes

Staff :HR/CNS/PD/SB/SNM/PH/MNV/PT

Name :

USN :

Section :

CS-A/B/C/D/CD/CY/IS/AIML

S.N

PART-A

M BT Co

- 1.1 Consider the following tables T1 and T2 , show the result of the operation
 $T1 \bowtie (T1.P = T2.A \text{ AND } T1.R = T2.C)$ T2

T1		
P	Q	R
10	A	5
15	B	8
25	A	6

T2		
A	B	C
10	b	6
25	c	3
10	b	5

2 L3 4

- 1.2. Write the 2 rules which must be satisfied , if a set of attributes FK in relation schema R1 is a foreign key of R1 that references relation R2

2 L1 2

- 1.3. Give an example for EXISTS operator of SQL(Considering the example of Insurance Database Schema of question no. 4 of PART-B)

2 L2 3

- 1.4 Write reflexive, decomposition/projective inference rules for functional dependencies

2 L1 1

- 1.5 What is a correlated query? Give example.

2 L2 4

PART-B

- 2 a. Explain the following relational model constraints with example.

- i Domain Constraint
- ii Key Constraint
- iii Entity Integrity Constraint

6 L1 2

- b. Explain how the relational model constraints that may be violated by delete operation. and the types of actions that may be taken if delete operation causes a violation

4 L2 3

- 3 a. Explain the relational algebra operation for set theory with examples.

6 L1 1

- b. Explain DIVISION operation of relational algebra with an example.

4 L2 4

- 4 Consider the Insurance Database given below.

PERSON (driver-id#, name , address)

CAR (Regno, model, year)

ACCIDENT (Report-Number, date, location)

OWNS (driver-id#, Regno)

PARTICIPATED (driver-id#, Regno, Report_number, damageamount)

Write the queries in relational algebra to:

- i Find driver-id# of every person, who owns a 'Toyota Fortuner' or a 'Hyundai Creta' car model
- ii Find the driver-id#, name of every person who has ever been involved in some car accident
- iii Find the number of accidents in which cars belonging to each model were

10 L3 4

	involved iv Find the driver-id# and name of all persons who have had all of their cars involved in some accident			
5.	Consider the following Schema : Sailors(sid: integer, sname: string, rating: integer, age: real); Boats(bid: integer, bname: string, color: string); Reserves(sid: integer, bid: integer, day: date) Write the queries in SQL to: i Find the sailors information whose name begins and ends with 'A' and has at least 3 characters. ii Find the ids of sailors who have reserved a red boat or a green boat. iii Find the name of sailors who have not reserved red boat iv Find the ids and names of sailors who have reserved two different boats on the same day. v Find the average age of sailors for each rating level that has at least two sailors.	10	L3	5
6.a.	Consider the relation scheme $R = \{E, F, G, H, I, J, K, L, M, N\}$ and the set of functional dependencies $\{ \{E, F\} \rightarrow \{G\}, \{F\} \rightarrow \{I, J\}, \{E, H\} \rightarrow \{K, L\}, K \rightarrow \{M\}, L \rightarrow \{N\} \}$ on R. What is the key for R?	4	L2	3
b..	Explain with an example Aggregate functions ,Grouping and Having clause in SQL	6	L2	1

Course Outcomes:

- CO1: Understand and explore the needs and concepts of relational, NoSQL database and Distributed Architecture
CO2: Apply the knowledge of logical database design principles to real time issues.
CO3: Analyze and design data base systems using relational, NoSQL and Big Data concepts
CO4: Develop applications using relational and NoSQL database
CO5: Demonstrate database applications using various technologies.

	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4	CO5
Total Marks	16	22	22	-	-	-	14	08	18	10	-



Academic year 2024-2025 (Odd Sem)

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Date	08-01-2025	Maximum Marks	10+50
Course Code	IS353IA	Duration	2 hours
Sem	V	CIE -II	
UG/PG	UG	Faculty: AS/VH/VG/JS/SHRS/ARA/MEM	
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (Common to CSE/ISE/CD/CY)			

Q.N	QUIZ	M	BT	CO
1	The process of removing details from a representation is called <i>Abstraction</i> .	1	1	4
2	The depth of a tree is given by "d". While using Iterative deepening search, the children of root are generated <i>d-1</i> times.	1	3	2
3	Suggest a method to characterize the quality of a heuristic	1	1	5
4	The k-NN algorithm is sensitive to the choice of K. Recommend a way to reduce it	1	2	1
5	The Naïve Bayes classifier is robust to irrelevant attributes. Give reason	2	3	4
6	Suggest 4 different ways to evaluate the performance of an algorithm	2	3	5
7	A node in a tree is represented by 4 components . Which are they ?	2	2	4

Q.N	TEST	M	BT	CO
1	<p>Apply BFS and DFS to the following graph and compare the results . Show all the necessary steps during the traversal and reasons. Also discuss the pros and cons of BFS and DFS</p> <p>3) evaluate admissibility (never over estimates the cost) 4) consistency (ensures that the cost of the path is non-decreasing) 4) It uses techniques like cross-validation to choose the optimal K</p>	10	3	1
2	<p>Find the most cost-effective path to reach from start state A to final state J using A* Algorithm for the graph in Figure :1</p> <p>Figure 1</p> <p>5) It is True because it assumes independence among features and irrelevant attributes contribute negligibly to problem. 6) Time complexity space completeness optimal solution 7) - State - parent node - Action</p>	10	4	2
3	<p>Consider the statements given below . State whether you agree or disagree with the statements . Give valid reasons for each</p> <p>a. Depth-first search always expands at least as many nodes as A* search with an admissible heuristic.</p> <p>b. $h(n) = 0$ is an admissible heuristic for the 8-puzzle.</p> <p>c. A* is of no use in robotics because percepts, states, and actions are continuous.</p> <p>d. Breadth-first search is complete even if zero step costs are allowed.</p>	10	3	5



Academic year 2024-2025 (Odd Sem)

Assessment year 2024-2025 (Odd Sem)

	<p>e. Assume that a rook can move on a chessboard any number of squares in a straight line, vertically or horizontally, but cannot jump over other pieces. Manhattan distance is an admissible heuristic for the problem of moving the rook from square A to square B in the smallest number of moves.</p>																																																										
4	<p>Consider the data given in Table 1</p> <table> <tr> <th>Instance</th> <th>A</th> <th>B</th> <th>C</th> <th>Class</th> </tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>+</td></tr> <tr><td>2</td><td>0</td><td>0</td><td>1</td><td>-</td></tr> <tr><td>3</td><td>0</td><td>1</td><td>1</td><td>-</td></tr> <tr><td>4</td><td>0</td><td>1</td><td>1</td><td>+</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>1</td><td>+</td></tr> <tr><td>6</td><td>1</td><td>0</td><td>1</td><td>+</td></tr> <tr><td>7</td><td>1</td><td>0</td><td>1</td><td>-</td></tr> <tr><td>8</td><td>1</td><td>0</td><td>1</td><td>-</td></tr> <tr><td>9</td><td>1</td><td>1</td><td>1</td><td>+</td></tr> <tr><td>10</td><td>1</td><td>0</td><td>1</td><td>+</td></tr> </table> <p>From the data given,</p> <p>(a) Estimate the conditional probabilities for $P(A +)$, $P(B +)$, $P(C +)$, $P(A -)$, $P(B -)$, and $P(C -)$.</p> <p>(b) Use the estimate of conditional probabilities given in the previous question to predict the class label for a test sample ($A = 0, B = 1, C = 0$) using the Naive Bayes approach.</p> <p>(c) Estimate the conditional probabilities using the m-estimate approach, with $p = 1/2$ and $m = 4$.</p> <p>(d) Repeat part (b) using the conditional probabilities given in part (c).</p>	Instance	A	B	C	Class	1	0	0	0	+	2	0	0	1	-	3	0	1	1	-	4	0	1	1	+	5	0	0	1	+	6	1	0	1	+	7	1	0	1	-	8	1	0	1	-	9	1	1	1	+	10	1	0	1	+	10	4	2
Instance	A	B	C	Class																																																							
1	0	0	0	+																																																							
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5	0	0	1	+																																																							
6	1	0	1	+																																																							
7	1	0	1	-																																																							
8	1	0	1	-																																																							
9	1	1	1	+																																																							
10	1	0	1	+																																																							
5	<p>Consider the dataset given below, Using K-NN Algorithm, classify the unknown instance : brightness =20 and saturation =25 to appropriate class . Assume $k=5$</p> <table> <tr> <th>Brightness</th> <th>Saturation</th> <th>Class</th> </tr> <tr><td>40</td><td>20</td><td>Red</td></tr> <tr><td>50</td><td>50</td><td>Blue</td></tr> <tr><td>60</td><td>90</td><td>Blue</td></tr> <tr><td>10</td><td>25</td><td>Red</td></tr> <tr><td>70</td><td>70</td><td>Blue</td></tr> <tr><td>60</td><td>10</td><td>Red</td></tr> <tr><td>25</td><td>80</td><td>Blue</td></tr> </table> <p>Also give any 5 characteristics of K-NN algorithm</p>	Brightness	Saturation	Class	40	20	Red	50	50	Blue	60	90	Blue	10	25	Red	70	70	Blue	60	10	Red	25	80	Blue	5+5	3	5																															
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Course Outcomes: After completing the course, the students will be able to:-

CO 1	Explain and apply AI and ML algorithms to address various requirements of real-world problems.
CO 2	Design and develop AI and ML solutions to benefit society, science, and industry.
CO 3	Use modern tools to create AI and ML solutions.
CO 4	Demonstrate effective communication through team presentations and reports to analyze the impact of AI and ML solutions on society and nature.
CO 5	Conduct performance evaluation, modeling, and validation of AI and ML solutions benefiting lifelong learning.

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Particulars	CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5	L6
Marks Distribution	11	21	-	5	23	21	3	35	20	-	-



Academic year 2024-2025 (Odd Sem)

DEPARTMENT OF

Computer Science & Engineering

Date	8 Jan 2025	Maximum Marks	10+50
Course Code	CS354TA	Duration	120 Min
Sem-V	CIE-II	Staff: HKK ASP SMS MRA	

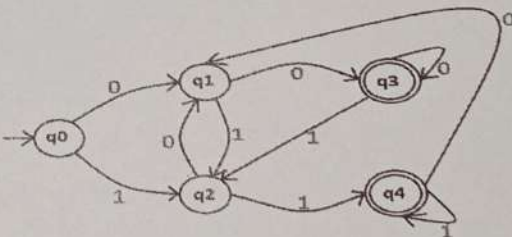
THEORY OF COMPUTATION

(Common to CSE & ISE)

PART-A

		Marks	BT	CO
1.1	Define left recursion. Eliminate left recursion from the following grammar $S \rightarrow (L) \mid a, L \rightarrow L, S \mid S$	2	L2	CO4
1.2	Convert the given CFG to PDA $S \rightarrow a \mid aA \mid B, A \rightarrow aB \mid \epsilon, B \rightarrow Aa$	2	L2	CO3
1.3	Find context-free grammars for the languages $L = \{a^n b^m : n \neq 2m\}$.	2	L3	CO2
1.4	Consider the following grammar with S as the start variable and a, ;, <, > are as terminals. $S \rightarrow <L \mid a, L \rightarrow aR \mid <LR, R \rightarrow > \mid ; L$. How many distinct parse trees are there for the string $<<a>; a>?$	1	L3	CO2
1.5	Let G be the CFG and let "L" denotes the number of left most derivations, "R" denotes the number of right most derivations and "P" denotes the number of parse trees. Assume L, R, P are computed for a particular string. For a given CFG G and a string w, what is the relation between L, R, P (use relational operators)?	1	L1	CO1
1.6	Define DPDA.	2	L1	CO1

PART-B

2.a	Construct PDA that accepts the language $L = \{Na(w) = Nb(w) + Nc(w)\}$ on $\Sigma = \{a, b, c\}$. Give the graphical representation for PDA obtained. Show the moves made by the PDA for the string caacaabc.	7	L3	CO4
2.b	Construct a finite automaton that accepts the language generated by the right linear grammar $S \rightarrow cA \mid baS, A \rightarrow bB \mid aC \mid \epsilon, B \rightarrow aA \mid bbC \mid \epsilon, C \rightarrow abA \mid baC \mid aS$	3	L2	CO1
3.a	Find a left-linear grammar for the language accepted by the finite automata below 	6	L3	CO3
3.b	Write a note on the languages accepted by PDA	4	L1	CO2
4.a	Define CNF. Transform the grammar with productions $S \rightarrow abAB,$ $A \rightarrow bAB \mid \lambda,$ $B \rightarrow BAa \mid A \mid \lambda$ into Chomsky normal form	6	L3	CO3
4.b	Define ambiguous grammar. Show that the following grammar is ambiguous and Construct an unambiguous grammar equivalent to this grammar. $S \rightarrow AB \mid aaB,$ $A \rightarrow a \mid Aa,$ $B \rightarrow b.$	4	L2	CO4

5	<p>Give an algorithm to convert PDA to CFG. Convert the following Pushdown Automata transitions to Context Free Grammar. Describe the language accepted by the CFG.</p> <p> $\delta(q_0, 0, Z) = (q_0, AZ)$ $\delta(q_0, 1, Z) = (q_0, BZ)$ $\delta(q_0, 0, B) = (q_0, \epsilon)$ $\delta(q_0, 1, A) = (q_0, \epsilon)$ $\delta(q_0, 0, A) = (q_0, AA)$ $\delta(q_0, 1, B) = (q_0, BB)$ $\delta(q_0, \epsilon, Z) = (q_1, \epsilon)$ </p>	10	L4	CO3
6.a	<p>Let $L_1 = \{a^i b^j c^k \mid i=j\}$ and $L_2 = \{a^i b^j c^k \mid j=k\}$. Find $L_3 = L_1 \cup L_2$ and $L_4 = L_1 \cap L_2$. Show that L_1, L_2 and L_3 are CFLs but L_4 is not CFL.</p>	6	L2	CO2
6.b	<p>Discuss the applications of Context free grammars.</p>	4	L2	CO1



RV College of Engineering®
Department of Computer Science and Engineering
CIE - II

Course & Code	Vulnerability Assessment & Penetration Testing (CY255TBD) Professional Core Course Elective-I		Semester: V
Date: 09/01/2025	Duration: 120 minutes	Max.Marks : 10 Marks (Quiz) + 50 Marks (Test)	
USN :	Name :		

NOTE: Answer all the questions

Sl.no.	Part-A Quiz	Marks	BT	CO
1	_____ is malicious software designed to secretly collect information about a user, their device, or their online activities without their knowledge or consent.	1	L1	CO1
2	Is Adware Always Malicious? Justify your answer.	1	L1	CO1
3	_____ is a category of software that hides itself and other software from system administrators in order to perform some nefarious task.	1	L2	CO1
4	_____ is a decoy system or network resource designed to attract, detect, and analyze cyber threats.	1	L1	CO1
5	What is a sandbox in malware analysis?	1	L1	CO2
6	List the two key steps in conducting a physical penetration test.	1	L2	CO2
7	Why are insider attacks more difficult to detect than external attacks? Justify your answer.	2	L2	CO2
8	What are the key steps to launch an exploit using the Metasploit console?	2	L2	CO3
Part-B Test				
1.a	Compare and contrast the benefits and challenges of static and dynamic malware analysis.	06	L2	CO4
1.b	List and briefly explain the key tools used in malware analysis.	04	L2	CO5
2.a	Elaborate the latest advancements in honeynet technology and their effectiveness in detecting and analyzing malware. Provide examples of how these innovations are applied in real-world cybersecurity.	06	L3	CO1
2.b	List and briefly explain the different types of Honeynets.	04	L2	CO

3	Discuss the key malware defensive techniques used in modern cybersecurity frameworks. Explain their significance and provide examples of how these techniques are implemented in real-world scenarios.	06	L3	CO4
3.b	Discuss the key strategies and measures for defending against physical penetration attacks.	04	L2	CO2
4.a	Explain the significance of physical penetration testing in cybersecurity. Outline the key steps involved in performing a physical penetration test effectively.	06	L3	CO2
4.b	Describe the steps involved in using the Metasploit console to launch exploits.	04	L2	CO3
5.a	Describe the typical process of conducting an insider attack.	06	L3	CO5
5.b	Discuss how Metasploit can be used to exploit client-side vulnerabilities.	04	L3	CO3