DEPARTMENT OF

INDUSTRIAL ENGINEERING & MANAGEMENT

Date	25th November 2024	Maximum Marks	10 + 50
Course Code	HS251TA	Duration	120 Min
Sem	V	CIE – I	

PRINCIPLES OF MANAGEMENT AND ECONOMICS

Note:

1. Answer all the Questions.

Sl. No.	Questions	M	BT	CO
	Part – A			
1	Which step in POSDCORB involves delegating tasks and giving structured instructions?	01	1	1
2	Define "effectiveness" in the context of management functions.	01	1	1
3	Which management approach is most associated with using data and mathematical models to improve decision-making?	01	1	1
4	In the Contingency Approach, what determines the best management style?	01	1	2
5	_____ is the primary scientist associated with the foundation of Administrative Theory.	01	1	1
6	How Total Quality Management (TQM) incorporates the Quantitative approach to improve customer satisfaction.	01	1	2
7	What role does fiscal policy play in stabilizing an economy during a recession?	01	1	
8	What is the role of Government within the circular flow model?	01	1	
9	What are the key components of macroeconomics that measure the health of an economy?	02	1	
	Part –B			
1 a	Mention the underlying reasons for the increase in productivity during the Hawthorne Studies, and how do these reasons challenge the idea that only physical conditions affect workplace efficiency?	06	4	
1 b	How does Contingency Theory explain the limitations of a 'one-size-fits-all' approach to management? Provide two examples to illustrate how it applies to different organizational situations.	04	3	
2	Compare and contrast the Classical and Behavioral approaches to management. How do these approaches address productivity, and what are their limitations in modern workplaces?	10	2	
3	Analyze how POSDCORB ensures both efficiency and effectiveness in management. Discuss the potential challenges managers face if one of these functions is underperformed.	10	3	
4	Evaluate the relevance of Systems Theory in managing modern organizations. How does its emphasis on interdependence and the environment benefit decision-making?	10	4	
5	Analyze how microeconomics, macroeconomics, and economic systems interact within the framework of the circular flow model. What challenges arise when these components fail to work in harmony?	10	4	

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

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L
	Quiz	Max Marks	04	02	-	2	2	10	-	-	-	
	Test		36	04	-	0	10	-	10	4	26	

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DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

Date	25th November 2024	**Maximum Marks**	10+50
Course Code	CD252IA	**Duration**	20+90 Minutes
Sem	V	Faculty: CNS/PD/SB/HR/PT//PHMNV/SNM	

Database Management Systems (Common to CS, IS, CD, AI & CY)

Sl.No		PART-A	M	BT	CO
1.		Identify two tasks performed by "actors on the scene" and "workers behind the scene" in a database environment. Provide examples of job roles for each category.	2	L3	1
2.		Which data model balances ease of understanding for end users and its implementation on computer systems? Give an example.	2	L3	1
3.		Given the scenario of a Library Management system, Transaction record entity that represents the details of books issued to members can be treated as a weak entity. Justify the statement with reason for weakness.	2	L3	2
4.		Differentiate between multivalued and composite attributes. Give an example representation for each.	2	L2	2
5.		Outline the importance of NULL value. Mention two instances where a value of given attribute can be NULL.	2	L2	1
Sl. No.		**PART-B**	**M**	**BT**	**CO**
1		For a **relationship type** *R* among *n* entity types *E*1, *E*2, ..., *En* mathematically define: *i)* Relationship Set *ii)* Relationship instances Also determine using an example, *iii)* Degree of relationship type *iv)* Relationship as attribute *v)* Role names in Recursive Relationship.	10	L2	1
2	(a)	With the help of a neat diagram, explain the three schema architecture.	06	L2	1
	(b)	Using the above architecture, outline the types of data independence.	04	L2	1
3	(a)	Explain the characteristics of database approach.	06	L2	1
	(b)	Differentiate between the total participation constraint and partial participation constraint. Give example	04	L2	1
4		A Farmer/Consumer Management system needs to be developed. The main objective of this project is to build an application which will help farmers from Indian villages to sell their products to different cities. Farmers wishing to avail the facility can directly register in the system, and sell their product. On the other side, consumers and wholesalers from urban settlements can procure their products from such agricultural colonies. The validity of all such transactions is tabulated for all future references. Requirements could be but not limited to • Upload of the crop to be sold. • Displays a list of the crops and their prices by that farmer. • Ordering any of the produce. • Update logs and transactions on sale. • The quantity and price of all the produce must be known to the farmer at the time of uploading. a) Design an ER diagram for the above requirements. Make suitable assumption wherever required and justify the same explicitly. b) Make suitable assumption to represent all participation types, cardinality ratios. Identify and represent different types of attributes. Justify your answer.	10	L4	2
5		For the above E-R Diagram, Apply the ER to Relational Mapping algorithm to convert ER to Relational Schema. Depict all steps appropriately and justify your answer.	10	L4	

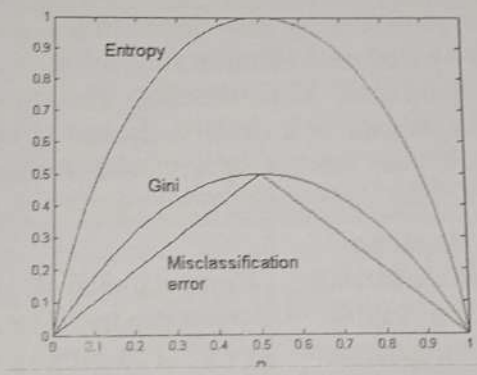
Academic year 2024-2025 (Odd Sem)

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Date	26 November 2024	Maximum Marks	(10+50) Marks
Course Code	IS353IA	Duration	(30+90) = 120 Min
Sem	V	CIE-1	
UG/PG	UG	Faculty: MEM/AS/VH/VG/JS/SHRS/ARA	

Artificial Intelligence and Machine Learning

(Common to CSE/ISE/CD/CY)

Sl. No.	Quiz Questions	M	L	CO
1	Justify whether the following sentence(s) hold true or false for Turing test in context AI. Marks are awarded for justification only. i. The Turing Test requires the machine to be able to convincingly simulate human intelligence to pass. ii. The Turing Test guarantees that a machine that passes it is intelligent.	02	L3	CO1
2	The _____ algorithm uses Entropy as a measure for constructing decision trees, while the _____ algorithm employs the Gini Index for splitting criteria.	02	L1	CO1
3	Draw observations from the graph below  	02	L3	CO1
4	List the key stopping criteria used in constructing a decision tree	02	L1	CO1
5	Differentiate Rationality and perfection in AI decision making with an example.	02	L2	CO1

Sl. No.	Test Questions	M	L	CO
1a	Analyze each of the following agent environments and determine whether they are fully or partially observable, deterministic or stochastic, static or dynamic, and discrete or continuous. Justify your classification with appropriate reasoning for each environment. i. autonomous Mars rover. ii. playing tic-tac-toe. iii. mathematician's theorem-proving assistant.	08	L3	CO

1b	For the following examples, find the PEAS (Performance measure, Environment, Actuators, Sensors) framework and describe each component: 1. Washing Machine 2. Autonomous Drone 3. Smart Home Thermostat	06	L3	CO1
2a	Consider the data set given in **Figure (2a):** Suppose we decide to construct a decision tree using binary splits and the Gini index impurity measure. Which feature and split point combinations would be the best to use as the root node assuming that we consider each of the input features to be unordered?	12	L3	CO2
2b	Discuss the approaches for splitting based on continuous attributes? Demonstrate the same using the dataset shown **Figure (2b)**.	06	L3	CO2
3a	Compare and contrast the types of intelligent agents—simple reflex, model-based reflex, goal-based, and utility-based—based on their rationality, memory use, ability to handle dynamic or partially observable environments, and computational complexity. Use examples like a robot vacuum or a virtual assistant to illustrate their differences and applications. Present your answer in a tabular format with the following columns:	10	L3	CO
3b	With the help of examples describe the potential causes and solutions of model overfitting in decision trees.	08	L2	C

price	maintenance	capacity	airbag	profitable
low	low	2	no	yes
low	med	4	yes	no
low	low	4	no	yes
low	high	4	no	no
med	med	4	no	no
med	med	4	yes	yes
med	high	2	yes	no
med	high	5	no	yes
high	med	4	yes	yes
high	high	2	yes	no
high	high	5	yes	yes

Figure (2a)

Record	Age	Purchased (Yes/No)
1	22	No
2	25	Yes
3	28	Yes
4	35	No
5	40	Yes

Figure (2b)

Agent Type	Rationality	Memory Usage	Handling Dynamic/Partially Observable Environments	Computational Complexity	Example/Use Case

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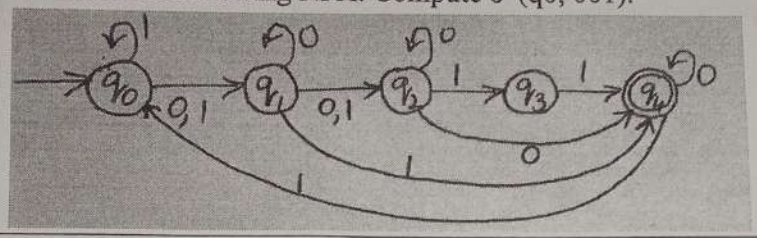
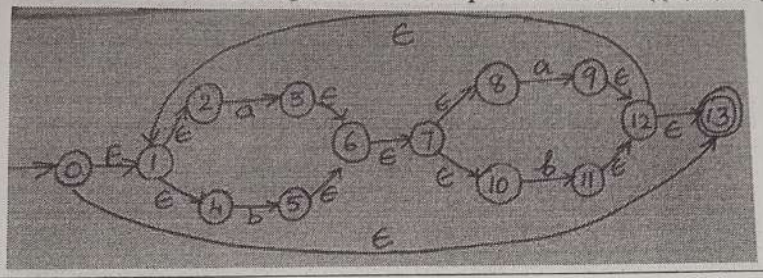
BT-Blooms Taxonomy, CO-Course Outcomes

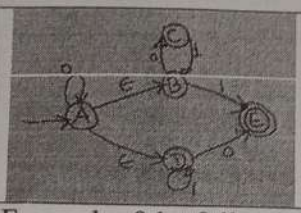
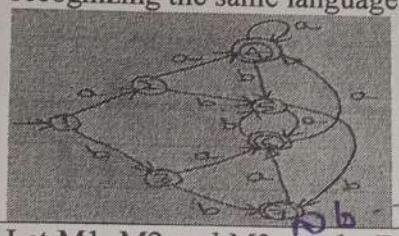
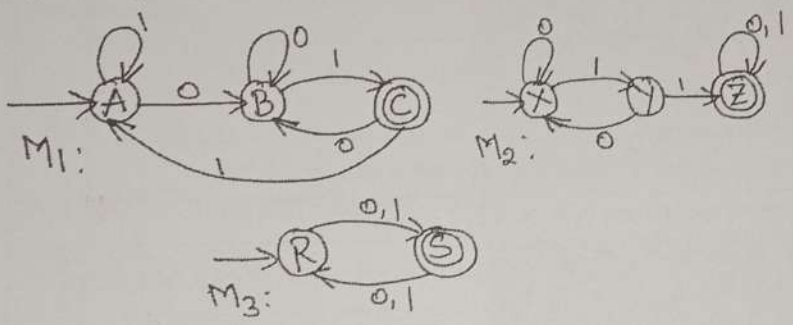
Marks Distribution	Particulars		CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5
	Test	Max Marks	42	18				2	12	46		

Course Outcomes	
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 ML solutions on society and nature.
CO5	Conduct performance evaluation, modeling, and validation of AI and ML solutions benefiting lifelong l

RV College of Engineering	**R V College of Engineering** **Department of Computer Science and Engineering** **CIE-I: Question Paper**		
Course: (CS354TA)	**THEORY OF COMPUTATION (CS354TA)**	**Semester: 5th**	
Date: 26-11-2024	**Duration: 120 minutes**	**Staff: SMS/HKK/ASP/MRA**	
Name:	**USN:**	**Section:**	**A,B,C,D,CD,CY,IS**

	PART-A			
1	Consider the following NFA. Compute δ*(q0, 001). 	2	L2	CO1
2	Consider the following ϵ-NFA. Compute ϵ-closure ({3, 5, 12}). 	2	L2	CO1
3	Consider two regular expressions r and s, where r=a*+b* and s=ab*+ba*+b*a+(a*b)*. i. Find a string corresponds to neither r nor s. ii. Find a string corresponds to both r and s.	2	L1	CO2
4	For the language L={ab, ac, c} over the alphabet ∑={a, b, c}. Find L^4.	2	L1	CO1
5	Construct ϵ-NFA for the regular expressions $(b + aba)^*ba^*$, so that there is a recognizable correspondence between the regular expression and the transition diagram.	2	L1	CO2

	PART-B			
1.a	Define regular expression. Give regular expressions which generates the following languages over the alphabet ∑={0, 1}. i. Set of all strings that do not end with 01. ii. Set of all strings that do not contain the substring 00.	6	L3	C03
1.b	Define ϵ-NFA, extended transition function of ϵ-NFA and language accepted by ϵ-NFA.	4	L1	CO
2.	Prove that for every ϵ-NFA there exists an equivalent DFA accepting the same language. For the ϵ-NFA shown below draw the equivalent DFA.	10	L4	CO

				
3.a	For each of the following regular expressions, draw DFA recognizing the corresponding language. i. (a+b)*ab(a+b)* ii. (a+b)*(ab+bba)	4	L4	CO3
3.b	For the DFA shown below, use the minimization algorithm to find a minimum state DFA recognizing the same language. 	6	L4	CO3
4.a	Let M1, M2 and M3 are the DFA's pictured below recognizing languages L1, L2 and L3 respectively.  a) L1-L2 b) L1∩ L3 c) L2 U L3	6	L4	CO3
4.b	Describe decision algorithms to answer each of the following questions. i. Given a regular expression r and a DFA M, are the corresponding languages the same? ii. Given two ϵ-NFAs, do they accept the same language?	4	L2	C
5.a	State and prove pumping lemma for regular languages. Use pumping lemma to show that the following language is not regular L={xy | x,y ϵ{0,1}* and y is either x or x^r}.	6	L2	
5.b	Answer the following questions a) Let M1 and M2 are the two NFA- ϵ. In the construction of M_u (Union of M1 and M2) consider this alternative construction: Instead of a new state q_u and ϵ-transition from it to q1 and q2, make q1 the initial state of the new NFA- ϵ, and create a ϵ-transition from it to q2. Either prove that this works in general, or give an example in which it fails. b) In the construction of M_c (Concatenation), consider the simplified case in which M1 has only one accepting. Suppose that we eliminate the ϵ-transition from the accepting state of M1 to q2, and merge these two states into one. Either show that this would always works or give an example in which it fails.	4	L4	

	(CY255TBD) **Professional Core Course Elective-I**		
Date: 27/11/2024	**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 an industry-standard that vendors used to determine the severity of a vulnerability.	1	L1	CO
2	_____ is the heart of every social engineering attack without which the attacks will not work.	1	L1	CO
3	_____Attack reduces the effort needed to break the encryption by exploiting trade-offs between time and memory.	1	L2	CO
4	How do you handle zero-day vulnerabilities?	2	L2	CO
5	List the commonly targeted ports during penetration testing. Give example.	2	L2	CO
6	What is John the ripper tool and how penetration testers are using it?	1	L1	
7	Differentiate between a black box, white box, and grey box penetration test.	2	L1	
	Part-B Test			
1.a	Differentiate between Vulnerability Assessment and Penetration Testing.	06	L2	
1.b	List and briefly explain the common challenges in vulnerability assessment.	04	L2	
2.a	Describe the most common vulnerabilities affecting organizations today. Discuss their causes, potential impacts, and strategies to mitigate these vulnerabilities.	06	L3	
2.b	Why is it important to understand an attacker's tactics and how can this knowledge help to strengthen their defenses against potential threats?	04	L2	
3	Outline the 10 steps involved in the penetration testing process. Explain the significance of each step and how it contributes to identifying and mitigating security vulnerabilities.	10	L	
4	Discuss any two common types of attacks used in penetration testing. Explain the purpose of each attack and their role in identifying vulnerabilities in an organization's security posture.	10		

5.a	Explain how risk analysis and penetration testing are different from each other. Why should penetration testing be carried out by a third party?	05	L
5.b	With over one million customers across Europe and Latin America, Visma is a leading provider of accounting, procurement, and payroll solutions. Visma employs over 5,500 professionals and includes 200 companies spanning over 20 countries across the world. As the firm transformed into a software-as-a-service (SaaS) provider, newer challenges related to security emerged. Visma not only needs to ensure the security of its own systems, but it has the responsibility of safeguarding customer data as well. With a larger attack surface, Visma wanted to gain increased protection against potential cyberattacks by effectively detecting and remediating vulnerabilities. To strengthen its defenses against potential threats, Visma adopted the Qualys Cloud Platform for in-depth security scans. **Analyze how Visma addressed the cybersecurity challenges arising from its transformation into a SaaS provider. Discuss the role of the Qualys Cloud Platform in enhancing Visma's security infrastructure, focusing on the benefits achieved through its implementation. Include specific examples from the case study to support your answer.**	05	

CO	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	C
s	05	24	31	***	***	***	12	16	07	

Outcomes:

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Bengaluru - 560059, Karnataka, India

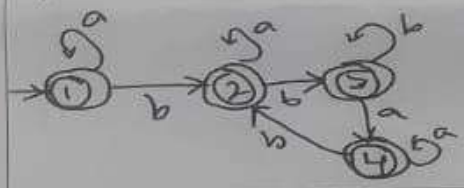
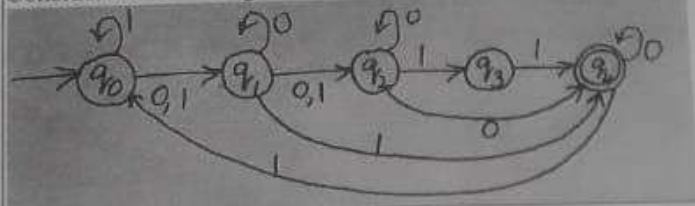
Go, change the world

Academic year 2024-2025 (Odd Sem)
DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Date	Nov 2024	Maximum Marks	10+50
Course Code	CS354TA	Duration	120 Min
Sem-V	Test-1	Staff: HKK|ASP|SMS|MRA	

THEORY OF COMPUTATION
(Common to CSE & ISE)

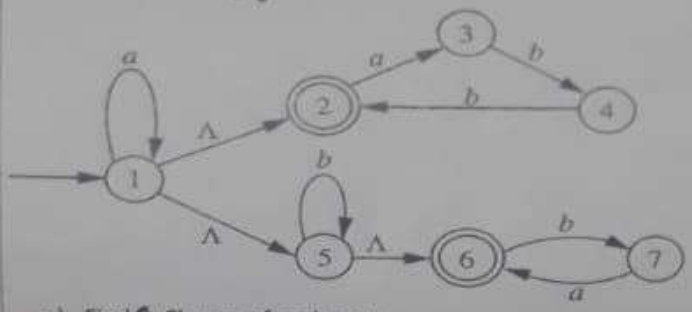
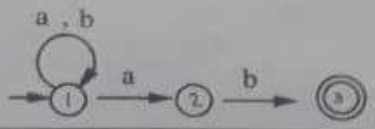
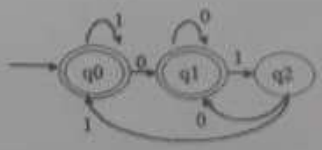
PART-A

		Marks	BT	CO
1.1	Consider the regular expressions, r=0*+1*, s=01*+10*+1*0+(0*1)*, t=1*(01)*0* a) Find a string of minimum length (excluding empty string) not in the language corresponding to the regular expression t. b) Find a string corresponding to s but not in t. c) Find a string corresponds to both r and s. d) Find a string corresponds to neither r and s.	2	L2	CO
1.2	Minimize the following DFA. The number of states in minimized DFA is ---------- 	2	L3	
1.3	Define Deterministic Finite Automata.	1	L1	
1.4	Construct $\in$-NFA for the regular expressions $(b + bba)^*ab^*$, so that there is a recognizable correspondence between the regular expression and the transition diagram.	2	L2	
1.5	Prove that the language L = {vwv: v, w $\in${a, b}*, |v| =2} is regular.	1	L3	
1.6	Consider the following NFA. Find δ*(q0,001) 	1	L2	
1.7	Name any two decision properties of regular languages.	1	L1	

PART-B

2	Consider transition table for a DFA			10	L3

	0	1
→*q1	q2	q1

		$q2$	q^3	q^1			
		$*q^3$	q^3	q^2			
		a) Give all the regular expressions $R^{(0)}_i$. Think of state q as if it were the state with integer number i. b) Give all the regular expressions $R^{(1)}_i$ and Simplify the expression as much as possible. c) Give a regular expression for the language of the automaton. d) Construct the transition diagram for the DFA and give a regular expression for its language by eliminating state q2.					
3		Consider the following ϵ-NFA  a) Find ϵ-Closure of each state b) Convert ϵ-NFA to DFA			10	L3	CO2
4a.		State and Prove pumping lemma for Regular Languages			6	L2	CO1
4b.		Discuss the applications of regular expressions with an example for each.			4	L2	CO2
5		Define distinguishable and indistinguishable states. Design the minimal DFA for the following NFA 			10	L3	CO4
6		Let M1 and M2 be the FAs as shown in below Figure, accepting languages L1 and L2, respectively. Draw FAs accepting the following languages. i. L1 ∪ L2 ii. L1 ∩ L2 iii. L2 – L1 iv. $L2^R$ v. L1 M1  M2 			10	L2	CO

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

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Max Marks	13	17	20	10	2	25	33	-	-	-