R17

Code No: R17A0506

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Supplementary Examinations, June 2024

Formal Language and Automata Theory

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I **BCLL** **CO(s)**

1 ***A*** Define NFA and DFA. Construct DFA for the given NFA **L2** **CO-I** **[7M]**

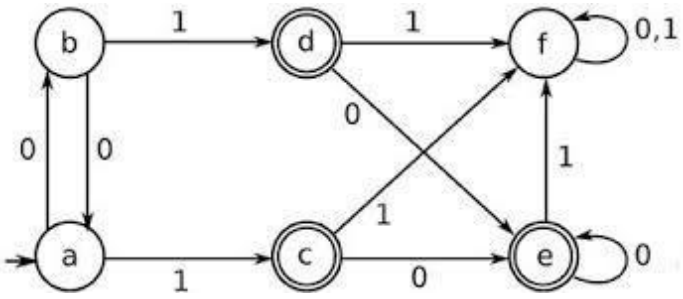
	Next state	
	0	1
→ q0	q0,q1	q0
q1	q2	q1
q2	q3	q3
(q3)	-	q2

B Define Moore machine? Construct Mealy machine corresponding to Moore machine? **L2** **CO-I** **[7M]**

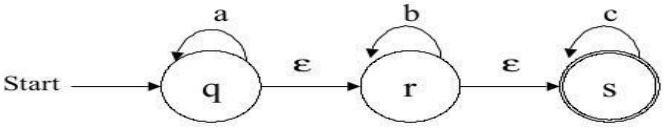
States (Q)	Next States		Output
	I/P=0	I/P=1	
→q1	q1	q2	0
q2	q1	q3	0
q3	q1	q3	1

OR

2 ***A*** Minimize the following finite automata **L3** **CO-I** **[7M]**

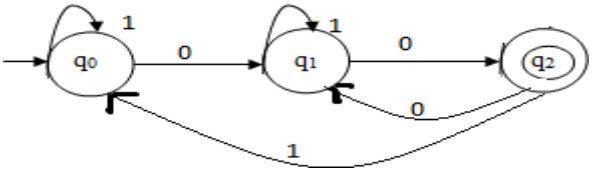


B Convert the following NFA with ε moves to DFA without ε moves **L3** **CO-I** **[7M]**



SECTION-II

3	***A***	Prove i) R=(1+00*1) + (1+00*1) (0+10*1)* (0+10*1)* = 0*1(0+10*1)* ii) R= $\epsilon+1^*(011)^*(1^*(011)^*)^*=(1+011)^*$	L3	**CO-II**	**[7M]**
	B	Explain about Arden's theorem, for constructing the RE from a FA with an example	**L1**	**CO-II**	**[7M]**



OR

4	***A***	Construct an equivalent FA for the given regular expression (0+1)*(00+11)(0+1)*	**L3**	**CO-II**	**[7M]**
	B	Prove that the language L= $\{a^n b^n c^n \mid n>=1\}$ is not regular using pumping lemma.	**L3**	**CO-II**	**[7M]**

SECTION-III

5	***A***	Explain about derivation and parse trees? Construct the string 0100110 from the Leftmost and Rightmost derivation. S→0S/1AA A→0/1A/0B B→1/0BB	**L2**	**CO-III**	**[7M]**
	B	Simplify the following context free grammar. (Here, Λ stands for epsilon (ϵ)). S → TU|V T→ aTb|Λ U→ cU| Λ V→ aVc|W W →bW| Λ	**L4**	**CO-III**	**[7M]**

OR

6	***A***	Convert the following grammar into Greibach normal form S→AA/a A→SS/b	**L4**	**CO-III**	**[7M]**
	B	b) Convert the following grammar into CNF. S→bA/aB A→bAA/aS/a B→aBB/bS/a	**L3**	**CO-III**	**[7M]**

SECTION-IV

7	***A***	Construct a PDA which recognizes all strings that contain equal number of 0's and 1's.	**L2**	**CO-IV**	**[7M]**
	B	Construct PDA from the following Grammar S→ aB B→ bA/b A→ aB	**L2**	**CO-IV**	**[7M]**

OR

8	***A***	Construct an equivalent PDA for the following CFG S→aAB | bBA A→bS | a B→ aS | b	**L3**	**CO-IV**	**[7M]**
	B	Convert the following PDA into an equivalent CFG δ (q0,a0,z0)→(q1,z1z0) δ(q0,b,z0)→(q1,z2z0) δ(q1,a,z1)→(q1, z1z1) δ(q1,b,z1)→(q1, λ) δ(q1,b,z2)→(q1,z2z2) δ(q1,a,z2)→(q1, λ) δ(q1, λ,z2)→(q1, λ)	**L4**	**CO-IV**	**[7M]**

SECTION-V

9	***A***	Construct a Turing machine for Language L={$a^n b^n$,where n>0}	**L1**	**CO-V**	**[7M]**
	B	(i) Explain Universal Turing machine (ii) Explain Counter Machine	**L3**	**CO-V**	**[7M]**

OR

10	***A***	Explain in detail about variations of the TM?	**L1**	**CO-V**	**[7M]**
	B	Construct a Turing machine that recognizes the language $a^n b^n c^n$.	**L3**	**CO-V**	**[7M]**

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Code No: R17A0509 **R17**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Supplementary Examinations, June 2024

Database Management Systems

(IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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			BCLL	CO(s)	Marks
		SECTION-I			
1	***A***	Explain the three different groups of data models with examples.	**L2**	**CO-I**	**[7M]**
	B	Describe the components of entity-relationship diagram with suitable examples.	**L4**	**CO-I**	**[7M]**
		OR			
2	***A***	Explain the following with examples. i) DDL ii) DML iii) DCL	**L2**	**CO-I**	**[7M]**
	B	Design an ER diagram for keeping track of your favourite cricket team. Include the matches played, runs scored by a player, places where the match is played, players in each match and other necessary attributes. From the above information track about the performance of player in their country and other countries, it should be modelled as derived attribute with suitable explanation. The entities along with attributes has to be designed and the relationship between the attributes should also be shown in the ER diagram.	**L6**	**CO-I**	**[7M]**
		SECTION-II			
3	***A***	Discuss in detail about Tuple Relational Calculus with all operations.	**L2**	**CO-II**	**[7M]**
	B	Elaborate Triggers in SQL and its types with examples.	**L2**	**CO-II**	**[7M]**
		OR			
4	***A***	What is Join and explain its types with example queries.	**L1**	**CO-II**	**[7M]**
	B	Explain in detail about structured query language? How the DDL and DML are different from SQL?	**L3**	**CO-II**	**[7M]**
		SECTION-III			
5	***A***	What is the need for Normalization? Explain Third Normal form with example.	**L3**	**CO-III**	**[7M]**
	B	Differentiate between single vs multivalued attributes	**L5**	**CO-III**	**[7M]**
		OR			
6	***A***	i) Describe the Boyce-Codd normal form with an example. (ii) Also state how it differs from that of 3NF.	**L4**	**CO-III**	**[4M]** **[3M]**
	B	Discuss Join Dependencies with an example.	**L2**	**CO-III**	**[7M]**

SECTION-IV

7	***A***	How can you implement atomicity in transactions? Explain.	**L4**	**CO-IV**	**[7M]**
	B	How concurrency is performed? Explain the protocol that is used to maintain the concurrency concept.	**L4**	**CO-IV**	**[7M]**
		OR			
8	***A***	Define Serializability. Explain the types of serializability with example.	**L1**	**CO-IV**	**[7M]**
	B	Briefly explain with an example about Validation based locking and Multiple Granularity?	**L3**	**CO-IV**	**[7M]**

SECTION-V

9	***A***	What is Recovery? Explain how to recover the data in the event of failures.	**L2**	**CO-V**	**[7M]**
	B	Mention the purpose of indexing. How this can be done by B+ tree? Explain.	**L4**	**CO-V**	**[7M]**
		OR			
10	***A***	Explain about Checkpoints with an example	**L2**	**CO-V**	**[7M]**
	B	Describe in detail about how the records are represented in a file and how to organize them in a file.	**L4**	**CO-V**	**[7M]**

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R17

Code No: R17A0507

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Supplementary Examinations, June 2024

Java Programming

(IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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		BCLL	Co(s)	Marks
	SECTION-I			
1	Write the significant differences between Procedure Oriented Programming and Object Oriented Programming. Write the Major Benefits of Polymorphism.	**L1**	**CO-I**	**[14M]**
	OR			
2	Why JAVA is Robust programming language? Discuss about Various Data types and Variables in Java Language?	**L1**	**CO-I**	**[14M]**
	SECTION-II			
3	How can we add a class to a package? Write about relative and absolute paths. Mention the benefits of packages and interfaces.	**L2**	**CO-II**	**[14M]**
	OR			
4	What is inheritance and how does it help to create new classes quickly. How do we implement polymorphism in JAVA? Illustrate with examples?	**L3**	**CO-II**	**[14M]**
	SECTION-III			
5	How to create a user defined exception? Write a program with nested try statements for handling exception.	**L3**	**CO-III**	**[14M]**
	OR			
6	With a neat sketch, explain the lifecycle of a Thread in JAVA programming. Write a JAVA program to display the number of characters, words, and lines in a given file.	**L3**	**CO-III**	**[14M]**
	SECTION-IV			
7	What are the common algorithms implemented in Collections Framework? What is difference between Array List and Linked List in collection framework? Explain	**L1**	**CO-IV**	**[14M]**
	OR			
8	How to connect your program to a Database? Classify different types of JDBC Drivers and discuss in detail about them	**L1**	**CO-IV**	**[14M]**
	SECTION-V			
9	Develop an applet program to change the foreground and background colors and to display the message in the order in which the init(), start() and paint() methods are called.	**L2**	**CO-V**	**[14M]**
	OR			
10	Illustrate the use of Grid layout. What are the subclasses of JButton and Jlabel classes in swing package?	**L1**	**CO-V**	**[14M]**

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