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Subject Code: ACSE0404

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY ,GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech. CSE/IT/AIML/IOT/CS/AI/DS

(SEM: IV SESSIONAL EXAMINATION –II) Session -2021-2022

Subject Name: Theory of Automata and Formal Languages

SET-B

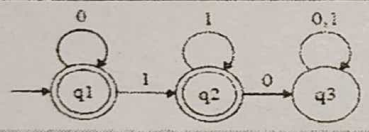
Time: 1.15Hours

Max. Marks:30

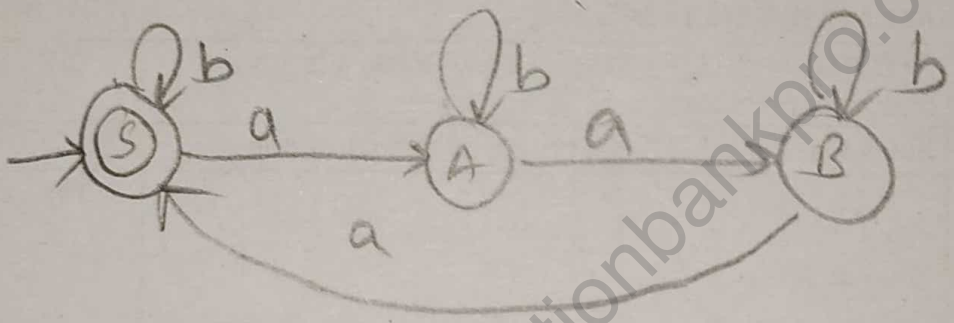
General Instructions:

- All questions are compulsory. Answers should be brief and to the point.
- This Question paper consists of 3 pages & 5questions.
- It comprises of three Sections, A, B, and C. You are to attempt all the sections.
- Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
- Section B - Question No-3 is Short answer type questions carrying 5 marks each. You need to attempt any two out of three questions given.
- Section C -Question No. 4 &5are Long answer type (within unit choice) questions carrying 6marks each. You need to attempt any one part *a* or *b*.
- Students are instructed to cross the blank sheets before handing over the answer sheet to the invigilator.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

		SECTION – A		
1.		**Attempt all parts**	(4×1=4)	CO
	a.	Consider this R.E. = (0 + 1)* (00 + 11) What will be the number of states in minimal DFA and NFA? 1. DFA – 5, NFA – 5 2. DFA – 5, NFA – 4 3. DFA – 4, NFA – 4 4. None	(1)	2
	b.	DFA accepts_____languages. 5. Type-0 6. Type-1 7. Type-2 8. Type-3	(1)	2
	c.	The context free languages are also known as: 1. Type-0 2. Type-1	(1)	3

		3. Type-2 4. Type-3		
	d.	More than one Parse tree can be generated from a same sentence. The Grammar which has this property are known as: 1. Ambiguous 2. Non ambiguous grammar 3. Intersection 4. Union	(1)	3
2.	**Attempt all parts**		**(2×2=4)**	CO
	a.	Write a CFG for the Language $L=\{a^n b^n c^m d^m / n>=1, m>=1\}$.	(2)	3
	b.	Show that the grammar $S \rightarrow aB \mid ab$,$A \rightarrow aAB \mid a$, $B \rightarrow ABb \mid b$ is ambiguous.	(2)	3
		SECTION – B		
3.	**Answer any <u>two</u> of the following-**		**[2×5=10]**	CO
	a.	P+PQ*Q = a*b Q* where P= b+aa*b and a is any regular expression.	(5)	2
	b.	Show that $L= \{a^p \mid p \text{ is a prime}\}$ is regular or not.	(5)	2
	c.	 Derive the regular expression corresponding to the finite automata.	(5)	2
		SECTION – C		
4	**Answer any <u>one</u> of the following-(Anyone can be applicative if applicable)**		**[2×6=12]**	CO
	a.	Construct a DFA with reduced states equivalent to regular expression 10+(0+11)0*1.	(6)	2
	b.	Define Chomsky Hierarchy. Construct a Finite machine from given grammar:	(6)	3

		$S \rightarrow aA \mid \lambda \mid bS$ $A \rightarrow aB \mid bA$ $B \rightarrow aS \mid bB$		
5.	**Answer any <u>one</u> of the following-**			
	a.	Let G be CFG S→ bB| aA, A→b| bS|aAA B→ a|aS| bBB For the string bbaababa find (a) Left Most Derivation (b) Right Most Derivation (c) Parse Tree	**(6)**	3
	b.	Explain the closure properties of the regular languages.	**(6)**	2



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