QP Code:RD21BTECH289 | Reg. No | | | | | | | | | | | AY 21

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester Regular) Examinations, December – 2023

21BCSPC35003 – Formal Languages and Automata Theory

(CSE, CSE(AIML),CSE(DS))

Time: 3 hrs | Maximum: 70 Marks

Answer all questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

	Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a.	Construct DFA equivalent where initial and final state is q0	CO1	K3
b.	Given L1 = {a, ab, a^2} and L2 = {b^2, aa} are the languages {a, b}. Determine (i) L1L2 (ii) L2L1	CO1	K3
c.	Write a regular expression to accept language of all strings with 2 a's followed by 2 b's over {a,b}.	CO3	K3
d.	Explain how stack is used for deciding the acceptance or rejectance of a string in PDA.	CO4	K2
e.	Write a short note on cantor's and Godel numbering.	CO3	K1

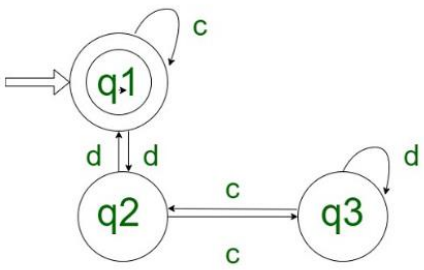
	0	1
qo	q0	q1
q1	q1	{q0,q1}

PART – B **(15 x 4 = 60 Marks)**

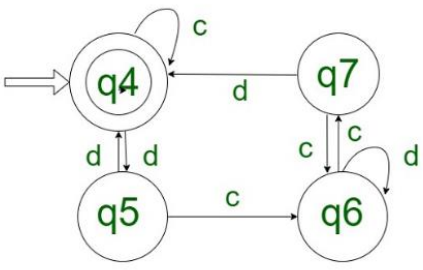
	Answer ***ALL*** questions	Marks	CO #	Blooms Level
2. a.	Construct NFA without ε from the given NFA with ε	7	CO1	K3

state/ Input	0	1	€
-->q0	q1		
q1(F)	q1		q2
q2		q0	

b.	Design the NFA over Σ= (0, 1) that accept the string where the 3rd last symbol is 1 and convert to corresponding DFA.	8	CO1	K3
	(OR)			
c.	Consider Two Different Automaton and check equivalence	7	CO1	K3



AUTOMATON-1



AUTOMATON-2

d.	Design a DFA over Σ= (a, b) that accepts the string having Even number of a followed by even number of b.	8	CO1	K3
3.a.	Using CYK algorithm check whether the string "baaba" is generated by the	7	CO3	K3

following grammar or not

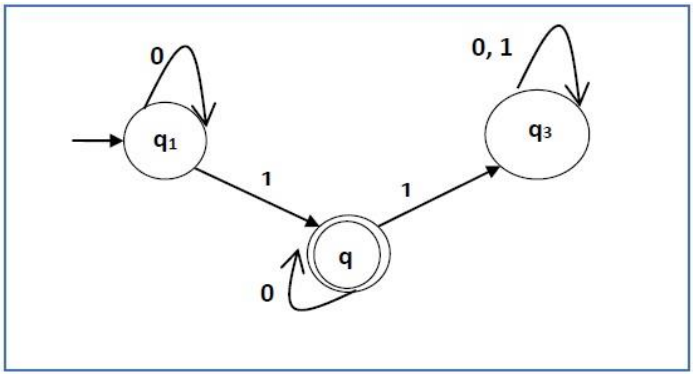
S->AB|BC

A->BA|a

B->CC|b

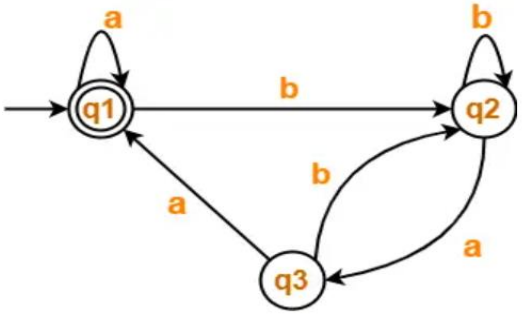
C->AB|a

b.	Construct a regular expression corresponding to the automata given below	8	CO2	K3



(OR)

c.	Consider the context free grammar S→SS|(S)|a Convert this grammar to Greibach Normal Form.	7	CO3	K3
d.	Derive the Regular expression for the FA:	8	CO2	K3



4.a.	Construct a PDA that accepts L = $\{a^n b^{2n} \mid n > =1\}$.	7	CO4	K3
b.	Design a Turing machine for L = $\{a^n b^n \mid n >= 1\}$.	8	CO4	K3

(OR)

c.	Construct a PDA for L= $\{wcw^r \mid w \in (a,b)^+\}$.	7	CO4	K3
d.	Define Post correspondence problem and solve for A and B A = (a,ab,bba) B = (baa,aa,bb)	8	CO4	K3
5.a.	Explain Ackermann function, evaluate the total value A(2,2).	8	CO3	K3
b.	Define Cantor and Godel numbering and encode the following string i) 1001. ii) 654	7	CO3	K3

(OR)

c.	Define Cantor and Godel numbering and encode the string i) 653 ii) 100101	8	CO3	K3
d.	Prove that intersection of two recursive languages is recursive.	5	CO3	K3

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