C.U. SHAH UNIVERSITY Winter Examination-2018

Subject Name: Theory of Computation

	Subject	Code: 4TE06TOC1	Branch: B.Tech (CE)	
	Semester	r: 6 Date: 30/10/2018	Time : 02:30 To 05:30	Marks : 70
	Instruction (1) U (2) I (3) I (4) A	ons: Use of Programmable calculator & instructions written on main answe Draw neat diagrams and figures (if Assume suitable data if needed.	any other electronic instrument is pr er book are strictly to be obeyed. f necessary) at right places.	ohibited.
Q-1		Attempt the following question	15:	(14)
	a) b) c) d) e) f) g) h) i) j) k) l) m) n)	Define: Finite Automata Define: Regular Expression List out special features of Turin Define: Context Sensitive Gram Differentiate the concept of deter Define: parse tree? What is difference between push What is unit production? The number of eight-bit strings b (i) 64 (ii) 128 (iii) 265 (iv) None Define: Push down Automata What is kleene closure? 3-SAT and 2-SAT problems are (i) NP-Complete and P (ii) U Complete (iv) Both in P Find a regular expression over the strings containing no more than Define: Turing Machine	ng machines. mar rminism ad non-determinism a down stack and push down store ? Deginning with either 111 or 101 is: e of the above Undecidable and NP –complete (iii) B me subset of {0, 1}*, the language of a one occurrence of the string 0.	both NP- Ill the
Alle	прт апу і	tour questions from Q-2 to Q-6		
Q-2	a) b)	Attempt all questions Define One-to-one and onto Fun functions. Define NFA – Λ . Explain how to	ctions. Also explain Compositions an ∞ convert NFA – Λ into NFA and FA	(14) d Inverse of with
Q-3	a)	suitable example. Attempt all questions Define Context Free Grammar(C	CFG).	(14)





	b)	Define the Strong Principle of Mathematical Induction. Prove the following using mathematical Induction. 7+ 13 + 19 ++ ($6n+1$) = n ($3n+4$)	
Q-4	a)	 Attempt all questions (i) Draw FA for (a + b)*baaa. (ii)Write a Regular Expression for the String of 0's and 1's in which number of 0's and 1's are even. 	(14)
	b)	Let L be the language corresponding to the regular expression $(011+1)^* (01)^*$. Find the CFG generating L.	
Q-5	a)	Attempt all questions Check whether the given grammar is in CNF S-> bA aB A-> bAA aS a B-> aBB bS b If it is not in CNF. Find the equivalent CNF	(14)
	b)	For following NFA find minimum FA accepting same language. a a a a a a a b a a a a a a a a	
Q-6	a)	Attempt all questions Draw PDA accepting strings of Brackets like following. $S \rightarrow SS \{S\} [S] \Lambda$	(14)
Q-7	b) a) b)	What is pumping lemma? Use the pumping lemma to show that the following language is not regular: L= $\{xy \mid x, y \text{ is } \{0,1\}^* \text{ and } y \text{ is either } x \text{ or } x^r\}$ Attempt all questions State and prove Arden's Theorem. Explain ambiguity in the CFG with the example of the "Dangling Else". Also write down the unambiguous grammar for the "Dangling Else".	(14)
Q-8	``	Attempt all questions	(14)

- Explain Polynomial Time Reductions and NP- Completeness. Draw TM for accepting Palindrome Strings in {a,b}*. a)
- b)

