

SE (IV) COMP (CBQS)

Q.P. Code :09887

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question No. 1 is compulsory.
 2. Attempt any **three** out of remaining **five** questions.
 3. Assumptions made should be clearly stated.
 4. Figures to the right indicate full marks.
 5. Assume suitable data whenever required but justify that.

- Q.1
- a) Differentiate between NFA and DFA 5
 - b) Explain Chomsky Hierarchy 5
 - c) Explain Rice's Theorem 5
 - d) Explain Pumping Lemma for CFG 5
- Q.2
- a) Design FA to check divisibility by 3 to binary number. 10
 - b) Using Pumping Lemma prove that following language is not regular: $L = \{0^m 1^{m+1} \mid m > 0\}$ 10
- Q.3
- a) Design Moore Machine to generate output A if string is ending with abb, B if string ending with aba and C otherwise over alphabet (a,b). And Convert it to Mealy machine. 10
 - b) Simplify the given grammar. $S \rightarrow aAa/bBb/BB \quad A \rightarrow CB \rightarrow A/S \quad C \rightarrow S/\epsilon$. 10
- Q.4
- a) Construct NFA for Given Regular expressions: 10
 - i) $(a+b)^*ab$,
 - ii) $aa(a+b)^*b$,
 - iii) $aba(a+b)^*$,
 - iv) $(ab/ba)^*/(aa/bb)^*$
 - b) Construct PDA accepting the language $L = \{a^{2n}b^n \mid n > 0\}$. 10
- Q.5
- a) Design minimized DFA for accepting strings ending with 100 over alphabet (0,1). 10
 - b) Design Turing machine to recognize wellformedness of parenthesis. 10
- Q.6 Write short note on (any four) 20
- a) Greibach Normal form
 - b) Deterministic PDA and Multistack PDA
 - c) Variants of Turing Machine
 - d) Halting Problem
 - e) Church-Turing Thesis