

Roll No.

3229

**B. Tech. (CSE) 5th Semester
Examination – February, 2022**

FORMAL LANGUAGES & AUTOMATA

Paper : PCC-CSE-305-G

Time : Three hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions, selecting *one* question from each Unit. Question No. 1 is *compulsory*.

1. Explain the following : 2.5 × 6 = 15

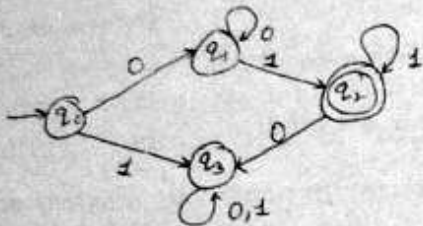
- (a) NDFA
- (b) Regular Expression
- (c) CFG
- (d) CNF
- (e) Non-Deterministic PDA
- (f) Multiheader Turing Machine

UNIT - I

2. What do you mean by NFA and DFA ? Explain the conversion of NFA to DFA with example. 15
3. State and prove Myhill Nerode theorem. 15

UNIT - II

4. State and prove Arden's method. Also find out the regular expression for the transition diagram. 15



5. State and prove pumping lemma for regular languages. Also show that $L = \{ a^i b^i \mid i \geq 1 \}$ is not regular. 15

UNIT - III

6. Explain in detail the Chomsky Hierarchies of Grammars. 15
7. Design a PDA for the language $L = \{ ww^r \mid w \in (a,b)^+ \}$ where w^r means reverse of w string. 15

UNIT - IV

8. Design a Turing machine to recognize the language $L = \{ a^n b^n c^n \mid n \geq 1 \}$. 15
9. Write a short note on the following : 15
- (a) Church-Turing thesis
- (b) Undecidability