STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI - 600 086
(For candidates admitted during the academic year 2019 – 2020 and thereafter)

M.Sc. DEGREE EXAMINATION – APRIL 2024
INFORMATION TECHNOLOGY
FOURTH SEMESTER

COURSE   : MAJOR CORE
PAPER   : FORMAL LANGUAGE AND FINITE AUTOMATA
SUBJECT CODE   : 19CS/PC/FF44
TIME   : 3 HOURS   MAX. MARKS: 100

SECTION A

Answer ALL the Questions: **10 X 2 =20**
1. What is a finite state machine?
2. How is DFA different from NFA?
3. What are the various operators of regular expressions and list their precedence?
4. List any four closure properties of regular sets.
5. When is a grammar said to be ambiguous?
6. Define Context Free Grammar.
7. What do you mean by instantaneous description for Push Down Automata?
8. Define Push Down Automata.
9. List the properties of Moore machine.
10. Mention any four applications of finite automata.

SECTION B

Answer any SIX of the following: **6 X 5 = 30**
11. What is a DFA? Illustrate a DFA (with transition diagram) for a language that accepts strings of binary language that start with '001'.
12. State and prove pumping lemma for regular languages.
13. Elaborate YACC parser.
14. Explain push down automata and mention its formal notation.
15. Justify how finite automata is used in text search applications.
16. How do you convert Mealy machine to a Moore machine?
17. Discuss
    a. Regular languages are closed under union
    b. Regular languages are closed under complement
18. Explain multi-tape Turing Machine.

SECTION C

Answer any FIVE of the following: **5 X 10 =50**
19. Explain Ɛ-NFA with necessary example.
20. Elaborate on converting a DFA to a regular expression by eliminating states.
21. Discuss leftmost and rightmost derivation with an example.
22. Illustrate the transition diagram of a Turing Machine for any relevant example.
23. Discuss Chomsky Normal Form for context Free Grammars.
24. Compare Mealy and Moore machine.
25. State and prove the equivalence of NFA and DFA with a suitable example.

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