Code No.: R22CS502PC | R22 | H.T.No. | | 8 | R | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
III–B.TECH–I–Semester End Examinations (Regular) - December- 2024
AUTOMATA THEORY AND COMPILER DESIGN
(Common for CSE, CSM, CSC)

[Time: 3 Hours]   [Max. Marks: 60]

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks.

PART-A   (10 Marks)

1. a) Define DFA.   [1M]
   b) Write about the applications of Finite Automata.   [1M]
   c) Illustrate about a Regular Expression.   [1M]
   d) Explain Rightmost Derivation with an example.   [1M]
   e) What is Push Down Automata? Explain.   [1M]
   f) What do you mean by Instantaneous Description of Turing Machine?   [1M]
   g) Explain about bottom-up parsing.   [1M]
   h) Demonstrate about context free grammar.   [1M]
   i) What are the evaluation orders for syntax directed definitions?   [1M]
   j) Discuss about the advantages of heap storage allocation.   [1M]

PART-B   (50 Marks)

2. Construct NFA with ε which accepts a language consisting the strings of any number   [10M]
   of 0's followed by any number of 1's followed by any number of 2's And also convert
   into NFA without ε transitions.

OR

3. a) Convert the following NFA with $\in$ - moves to DFA as shown in Figure 1.   [5M]
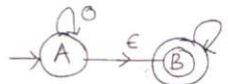

Figure: 1

   b) Differentiate between NFA and DFA.   [5M]

4. a) Derive left and right most derivations for the input string a=b*c+d/e for the given   [5M]
   Grammar.
   E→E+E|E-E|E*E
   E→E/E
   E→(E)|id
   b) Construct Finite Automata for ((0+1)*00)*110.   [5M]

OR

5. a) Apply pumping lemma for the language L={a^n/n is prime} and prove that it is not   [5M]
   regular.
   b) Write about the applications of Regular expressions.   [5M]

6. a) Construct a PDA to accept the language generated by the following CFG.   [5M]
   S→Aab
   A→Aab|b
   b) Design Push down Automata for L = {$a^n b^n$ | n ≥ 1}.   [5M]

OR

7. a) What are undecidable problems? Explain with example.   [5M]
   b) Write the formal description of Turing machine.   [5M]