MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
III B.Tech I Semester Supplementary Examinations, June/July 2024
Automata and Compiler Design
(CSE-CS, CSE-DS & B.Tech-AIDS)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1   A   Convert the following NFA to DFA.   **[7M]**

δ	0	1
→p	{p,q}	p
q	r	r
r	s	_
*s	s	s

     B   Construct a DFA to accept the language L={w/w has both an even number of   **[7M]**
          0's and even number of 1's}.

                                    OR

2   A   Construct NFA for the regular expression $(0+1)^* 01^* + (10+11)1^* 0$ **[7M]**

     B   Construct a Context-Free-Grammar(CFG) for the language L={WW^R/W   **[7M]**
          defined over the alphabet {a,b}} and construct a parse tree for the string
          abbbba using the previously defined CFG.

SECTION-II

3   A   Construct an LL(1) parse table for the following grammar: **[10M]**

$$E \rightarrow TE^t$$
$$E^t \rightarrow +E \mid \epsilon$$
$$T \rightarrow FT^t$$
$$T^t \rightarrow T \mid \epsilon$$
$$F \rightarrow PF^t$$
$$F^t \rightarrow *F^t \mid \epsilon$$
$$P \rightarrow (E) \mid a \mid b.$$

     B   Give structure of a YAAC source program.   **[4M]**

                                    OR

4   A   What is bottom-up parsing ? Differentiate between top-down and bottom-up   **[4M]**
          parsing with suitable examples.

     B   Consider the following grammar: **[10M]**
          S -> E   E -> E + T /T   T -> T * F /F   . F -> (E)/ id
          Construct LR(0) parsing table for the given grammar.

SECTION-III

5   A   Consider the following code: **[6M]**

```
if (x > 0) {
    y = x + 1;
} else {
    y = x - 1;
}
```

Translate the given if-else statement into intermediate code.

B   Discuss Chomsky's Hierarchy of languages and their recognizers in detail.   **[8M]**

OR

6   A   Explain the equivalence of Type expressions.   **[7M]**

B   Define type checking. Explain the static type checking and dynamic type checking.   **[7M]**

SECTION-IV

7   A   Discuss how to access non-local data with and without nested functions.   **[7M]**

B   Illustrate dangling pointer reference in storage allocation with an example.   **[7M]**

OR

8   A   What is a basic block? Write the steps to identify basic blocks.   **[4M]**

B   Discuss the optimization of Basic blocks in detail with suitable examples.   **[10M]**

SECTION-V

9   A   Construct the DAG for the following basic block: **[8M]**

```
a=b+c
b=a-d
c=b+c
d=a-d
```

B   Discuss different Object Code forms with suitable examples.   **[6M]**

OR

10   A   . Consider the following basic block of 3-address instructions: **[7M]**

```
a:=b+c
x:=a+b
b:=a-d
c:=b+c
d=a-d
y=a-d
```

Write the next-use information for each line of the basic block.

B   Explain register allocation using graph colouring.   **[7M]**

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