(c) What is the need of the Three Address code and explain the steps of three address code for the following example :   (CO4)

$$X = (a \times b) + (c + d) - (a + b + c + d)$$

5. (a) Describe the different techniques of the code optimization. Give an example for the common sub expression optimization techniques.   (CO5)

(b) Construct a TM for the language $L = \left\{ 0^n 1^n 2^n \right\}$ where $n \geq 1$.   (CO5)

(c) What are the storage allocations in the compiler ?   (CO5)

630

H   **Roll No. ....**

TMC–302

M. C. A. (THIRD SEMESTER) END SEMESTER EXAMINATION, Dec., 2023

AUTOMATA THEORY AND COMPILER CONSTRUCTION

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

     (ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

     (iii) Total marks in each main question are **twenty**.

     (iv) Each sub-question carries 10 marks.

1. (a) Write Regular Expressions for the following languages of all strings in {a,b}* :   (CO1)

     (i) For all the strings of even length over the {a, b}.

     (ii) For all the strings that does not start and end with the same double symbol.

P. T. O.

(b) Define Mealy and Moore Machines and differentiate between them with an example. (CO1)

(c) Construct a DFA for the language over $\{0, 1\}*$ such that it contains "101" as a substring. (CO1)

2. (a) Define the Pumping Lemma for Regular languages with criteria. For : (CO2)

$$L=\{wcw^r|w \in (a,b)*\}$$

(b) Explain the Chomsky Hierarchy of the Automata Theory. Differentiate between all the types of Finite Automata each with an example. (CO2)

(c) Define PDA. Construct the PDA for Language $L = \{a^n b^m \mid m = 2n, n > 0\}$.

(CO2)

3. (a) What is parsing ? Describe the classification of the Parsing. Differentiate between the LR and LL parsers. (CO3)

(b) Construct the First and Follow with appropriate steps using the following Production Rules : (CO3)

S->ABC | CbB | Ba

A->da | BC

B->g | ∈

C->h | ∈

(c) Consider the following grammer : (CO3)

$E \rightarrow E - E$

$E \rightarrow E \times E$

$E \rightarrow id$

Parse the input string id–id × id using a shift-reduce parser.

4. (a) Describe the semantic analysis phase of the compiler construction. Define type checking and different types of attributes.

(CO4)

(b) Differentiate between syntax tree and parse tree, each with an example. (CO4)

P. T. O.