

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

III-B.TECH-II-Semester End Examinations (Supply) - December- 2025
AUTOMATA THEORY AND COMPILER DESIGN
(Common for IT, CSD)

[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.

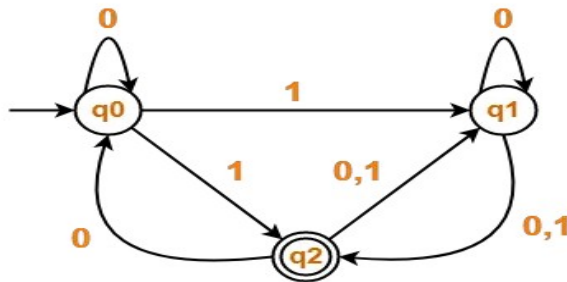
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(10 Marks)**

1. a) What are the differences between DFA & NFA? [1M]
- b) Define string. Write about concatenation of two strings. [1M]
- c) Give the regular expression to accept the language consisting strings of a's and b's of even length. [1M]
- d) Define regular grammar. [1M]
- e) Sketch the block diagram of PDA. [1M]
- f) What is decidability? Give an example. [1M]
- g) Differentiate between compiler and interpreter. [1M]
- h) What is the role of lexical analyzer? [1M]
- i) Define synthesized and inherited attributes. [1M]
- j) Distinguish between static scope and dynamic scope. [1M]

PART-B**(50 Marks)**

2. Convert the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA). [10M]

**OR**

- 3.a) Explain the Block diagram of a finite state machine with an example. [5M]
- b) Design a DFA which accepts set of all strings which are divisible by 5 for binary alphabet. [5M]
- 4.a) Prove that $(1+00^*1) + (1+00^*1)(0+10^*1)^*(0+10^*1) = 0^*1(0+10^*1)^*$. [5M]
- b) Show that $L = \{ww^R \mid w \in (0+1)^*\}$ is not a regular. [5M]

OR

- 5.a) Discuss closure properties of Regular languages. [5M]
- b) What is meant by ambiguous grammar? Prove that the following grammar is ambiguous. P: $S \rightarrow E + E/E * E/id$. [5M]

6. Construct a pushdown automaton which accepts the language of words over the alphabet {a,b} containing more a's than b's. [10M]

OR

7. Construct a Turing Machine to recognize the Language $\{ a^n b^n c^n / n \geq 1 \}$. [10M]

8. Discuss in detail about various phases of a compiler. [10M]

OR

9. Consider the grammar. $E \rightarrow E + T, E \rightarrow T, T \rightarrow T * F, T \rightarrow F, F \rightarrow (E) / id$ Construct CLR parsing table for the above grammar. Give the moves of the CLR parser on $id * id + id$. [10M]

10.a) Explain heap management mechanism. [5M]

b) Explain variants of syntax trees. [5M]

OR

11. Explain how to implement 3 address code using quadruples, triples and indirect triples with an example. [10M]
