

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, December-2024

FORMAL LANGUAGES AND AUTOMATA THEORY

(COMPUTER SCIENCE AND ENGINEERING)

Time: 3 Hours

Max. Marks: 75

Section – A (Short Answer type questions)

(25 Marks)

Answer All Questions

	Course Outcome	B.T Level	Marks
1. Define Finite Automata.	CO1	L2	2M
2. Explain structural representation of Finite Automata.	CO1	L4	3M
3. What is Regular Expression?	CO2	L4	2M
4. What is the relation between Finite Automata and Regular expression?	CO2	L3	3M
5. Define Context Free Grammar.	CO3	L5	2M
6. What are the applications of Pumping Lemma?	CO3	L1	3M
7. What are the applications of Context Free Grammar?	CO4	L1	2M
8. Differentiate between Push Down Automata and Turing Machine.	CO4	L1	3M
9. List the different models in Turing Machine?	CO5	L2	2M
10. What are the required fields of an instantaneous description of a Turing machine?	CO5	L1	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks.

(5 X 10M = 50M)

11. Differentiate between DFA and NFA with Examples. CO1 L3 10M

A)

OR

B) Convert the following NFA to DFA CO1 L3 10M



12. i) Define Moore Machine. Explain with example. CO2 L2 10M

A) ii) List out the decision properties of Regular Language.

OR

B) Define Pumping Lemma. List the applications of pumping lemma. CO2 L2 10M

13. Consider the following productions CO3 L3 10M

A) $S \rightarrow aB \mid bA$ $A \rightarrow a \mid aS \mid bAA$ $B \rightarrow b \mid bS \mid aBB$

Derive aaabbabbba using Left Most Derivation & Draw Parse tree.

OR

B) Consider the following productions CO3 L3 10M

 $E \rightarrow E+T/T$ $T \rightarrow T*F/F$ $F \rightarrow (E)/ID$ Derive $id+id*id$ using Left Most Derivation & Right Most Derivation.

14. List the steps to convert CFG to PDA. CO4 L3 10M

A)

OR

B) Construct a Push Down Automata for the language $L = \{a^n b^n \mid n \geq 0\}$. CO4 L3 10M

15. i) Explain in detail about the types of Turing Machine.

CO5 L2 10M

A) ii) Write a shot notes on post's correspondence problem and check the following is PCP or not.

I	A	B
1	11	111
2	100	001
3	111	11

OR

B) What is Turing Machine and Multi tape Turing Machine? Show that the languages accepted by these machines are same.

CO5 L3 10M