

PE-852-CV-19
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (4th Semester)
Examination, June 2022
THEORY OF COMPUTING

Time : Three Hours]

[Maximum Marks : 80
[Minimum Pass Marks : 29

Note : Answer from both the Sections as directed. The figures in the right-hand margin indicate marks.

Section-A

1. Answer the following short answer questions:

2x10=20

- (a) Write the formal definition of language.
- (b) What is transition table.
- (c) What are the differences between CFL and DCFL?
- (d) When we use pumping lemma?
- (e) Write the closure properties of regular language.
- (f) What is left recursion? Write an example of left recursive production.
- (g) Write the formal definition of DPDA?
- (h) Write the closure properties of CSL.
- (i) What is Recursive set?
- (j) What is decidability?

Section-B

12x5=60

Answer the following Long-Answer questions:

2. Construct the minimum state finite automata equivalent the given regular expression
 $(1 + 0)^*(01 + 10)(00 + 11)^*$

OR

What is mealy machine? How it differ from Moore machine? Explain the process of converting an mealy machine into Moore with suitable example and vice-versa.

3. Explain Myhill-Nerode theorem with suitable example.

OR

Explain the process of finding regular expression equivalent to a given NFA/DFA with suitable example.

4. Construct the grammer G for the following languages.

- a). $L(G) = \{a^n c^n a^n\} | n > m \text{ \& } n \geq 0$
- b). $L(G) = \{wcw^T\} | w \in (a, b)^*$
- c). $L(G) = \{a^n b^n a^n\} | n \geq 0$

OR

Convent the following grammer $S \rightarrow AB, A \rightarrow BS|Ab|a, B \rightarrow BS|a|b. C \rightarrow a|b$ into GNf

5. Construct the Pda A accepting $L = \{wcw^T | w \in \{a, b\}^*\}$ by final state.

OR

Construct the PDA/TM for accepting $L = \{a^n b^n c^n\} | n \geq 0$

6. Explain Russedis paradox with suitable example.

OR

Explain chukch's hypothesis uses with suitable example.