Total No. of Questions :8] *[Total No. of Printed Pages : 2*

Roll No .....

MCADD-604

M.C.A. (Integrated), VI Semester

Examination, May 2022

Theory of Computation

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) What is Alphabet? Define language over an alphabet.

   b) What is set? List out the operations performed on sets.

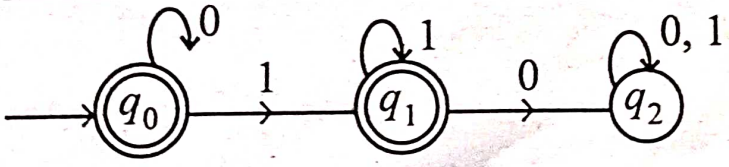
2. a) Show that the language $L = \{a^n b^n | n \geq 1|\}$ is unambiguous.

   b) Obtain a derivation Tree for the string 0011000 using grammar

   $S \rightarrow AOS/O/SS,\ A \rightarrow S/1A/10$

3. a) Explain the closure properties of Regular languages.

   b) Find the Regular Expression corresponding to the automata.



4. Show that the following grammars are Ambiguous

   i) $S \rightarrow SS / a / b$

   ii) $S \rightarrow A / B / b, A \rightarrow \alpha AB / ab, B \rightarrow abB / \wedge$

5. a) Show the procedure of converting a PDA into equivalent CFG using suitable example.

   b) Design PDA to accept.

   $L = \{a^n b^n \mid n \geq 1\}$

6. What is Turing machine? Explain various types of Turing machine.

7. a) Find the context sensitive grammar for the following language $a^n b^n c^n \mid n \geq 1$

   b) State post correspondence problem. Explain it with the help of an example.

8. Design Turing machine to recognize the language $\{0^n 1^n / n \geq 1\}$.

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