Total No. of Questions: 8] [Total No. of Printed Pages: 3

Roll No .....

CS-501 (GS)

B.Tech., V Semester

Examination, May 2023

Grading System (GS)

Theory of Computation

Time: Three Hours

Maximum Marks: 70

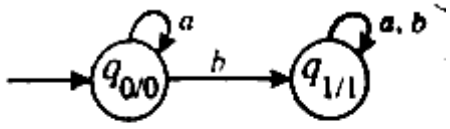
Note: i) Attempt any five questions.

ii) All questions carry equal marks.

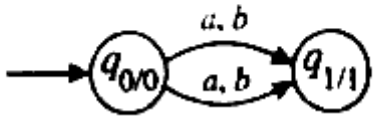
iii) In case of any doubt or dispute the English version question should be treated as final.

1. Convert the following Moore machine to Mealy.

i)



ii)



(a, b),

2 a) For $\Sigma = \{a, b\}$, construct DFA's that accept the sets consisting of

i) All the strings with exactly one ‘a'.

ii) All the string with atleast one ‘a'.

iii) All strings with atleast one 'a' and followed by exactly two b's.

3. Describe the following sets by regular expression.

i) Strings containing 1100 as substrings.

ii) The set of all strings of 0's are 1's ending with 00. .....}.

iii) {Λ, a, aa, aaa, aaaa, ...

4. a) Explain Arden's theorem and Pumping Lemma.

| Arden's theorem और Pumping Lemma

b) What is Ambiguity? Explain taking any two examples.

5. a) Design a CFG.

i) $L(G)= \{a^i b^j c^k \mid i \neq j \text{ (or) } j \neq k\}$

ii) $L(G_1)= \{a^i b^{2j} \mid i \geq 0\}$

b) Define a context free grammar with example.

6. a) Explain DPDA and NPDA with taking a suitable example.

b) Explain Recursively enumerable language and decidability.

7. Design a Push down automata.

i) $a^n b^{3n}$, $n \geq 1$

ii) ww^R, $w \in (a, b)^2$

8. Write short notes on: (Any three)

i) Halting problem

ii) Turing machine

iii) Chomsky Normal form

iv) 2 way DFA

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