Enrollment No.: _

P ARUL UNIVERSITY

Faculty of Engineering & Technology

B Tech Examination

Theory of Computation 203108301 IT/Sem-5

Date: 09/08/2022 Time: 10:30 AM to 12:00PM Total Marks: 40

Q.1 (A) Multiple Choice Questions 05

1 L= {anbncn| n= 1,2,3} is an example of a language that is
a. Context free
b. Not Context Free
c. Not Context Free but whose complement is CF
d. Both (b) and (c)

2. The set of all strings over the alphabet S={a,b} (including *e)* denoted by
a. (a+b)*
b. (a+bt
c.a+t,+
d. a'b"

3. Which of the following strings is not generated by the following grammar? S-+SaSbS | e
a.aabb
b.abab
c. aababb
d. aaabb

4. If Li and L2 are context free language and R a regular set, then which one of the languages below is not necessarily a context free language?
a. LI L2
b. LIn L2
c. Ll UL2
d.LI nn

5. The logic of pumping lemma is a good example of
a. Pigeon-Hole Principle
b. Divide & Conquer techniques
c. Recursion
d. Iteration

(B) Fill in blanks 05

1. What is the highest type number which can be applied to the following grammar? ~ "fa W, W, ~4

2. The intersection of CFL and regular language

3. A grammar that produces more than one parse tree for some sentence is called _

4. The concept ofFSA is much used in this part of the compiler. _

S'--7 {)cA_ '7 A ~ j)q b O abc

~

5. Context free grammar is not closed under

Q.2 Attempt any four(Short Questions) 12

(1) Prove that the following language is ambiguous
S-+S+S | S*S | a

(2) What are the closure properties of regular languages?

(3) Draw Finite Automata for language accepting strings ending with '01' over input alphabets $L = \{O,I\}$

(4) Explain moore machine and mealy machine.

(5) Convert the following NFA to FA

b

Q.3 Attempt any two 08

(1) Find a regular expression corresponding to each ofthe following subsets of {O,1}*

a) All string begins or ends with 00 or 11
b) String starts with 1 and ends with 0

(2) What is CNF? Convert the following CFG into CNF.

S -> ASA laB,
A -> B | S,
B -> b | e

(3) Minimize the following Finite Automata

Q.4 (A) What are the steps to convert a CFG to Chomsky Normal Form? 05

(B) Develop an FA corresponding to following regular expression 05
$r = (11 + 110)^*0$
Explain the properties of Distinguishability of Strings and Equivalence classes, show minimum numbers of states necessary for this FA.

OR

(B) Define pumping lemma for regular language. Prove that the language 05
L = {aili is NOT prime} is irregular.