Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020
Course Code : CSE2018
Course Name : Sem V - CSE2018 - Theory of Computation
Program : B.Tech. CBC/CBD/CCS/CSD/CDV/CIT/CSG/CST/ECM/ECI/ISE/IST

Date : 9-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS **10 X 2 = 20M**

1. Compare the powers of different types of automata witha an example each.
(CO1) [Knowledge]

2. List the operations of strings.
(CO1) [Knowledge]

3. Define Non Deterministic Finite Automata (NFA).
(CO2) [Knowledge]

4. Construct NFA for L= { all strings with prefix ab) } over {a,b}.
(CO2) [Knowledge]

5. The grammar G=({S}, {a, b}, S, P)
Where P ={S → aaSbb|ab|ϵ} is a CFG. Find the language represented by given grammar.
(CO3) [Knowledge]

6. The grammar G=({S}, {a, b}, S, P)
Where P ={S → aSa, S → bSb, Sàϵ} is a CFG. Find the language represented by given grammar
(CO3) [Knowledge]

7. Differentiate between DPDA and NPDA.
(CO4) [Knowledge]

8. Mention the ways of representing the Deterministic PDA.
(CO4) [Knowledge]

9. Define the transition function in TM.
(CO5) [Knowledge]

10. Write the hierarchy of Languages in Theory of Computation.
(CO5) [Knowledge]

PART B

ANSWER ALL THE FIVE QUESTIONS **5 X 10 = 50M**

11. Minimize the following DFA to its equivalent machine?

	0	1
->A	B	F
B	G	C
*C	A	C
D	C	G
E	E	F
F	C	G
G	G	E
H	G	C

(CO2) [Comprehension]

12. Define DFA. Design a DFA accepting the language L={ w0100w | w belongs to {0, 1}*}

(CO2) [Comprehension]

13. Using pumping lemma theorm prove that the language L = { w ∈ {a,b}* : na(w) < nb(w) } is not regular.

(CO3) [Comprehension]

14. Construct PDA for L={ 0^n 1^m 2^m 3^n, n &m >=1}

(CO3) [Comprehension]

15. Write all stack operations used for PDA construction along with example and stack diagram.

(CO5,CO2) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS **2 X 15 = 30M**

16. Construct a Turing machine for L={ 1^n 2^n 3^n, n>=1} .
Write Transition Diagram, Transition Table, TM Tuples, one string acceptance and one string rejection.

(CO4) [Application]

17. Define a Turing machine. Also, design a turing machine to accept the set of all palindromes over {0,1}* with transition table. Write the transition diagram for the constructed turing machine and write the sequence of ID's for the input string '1001'

(CO5) [Application]

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