FACULTY OF ENGINEERING

B.E. (CSE) V – Semester(CBCS) (Backlog) Examination, October 2020

Subject: Automata Languages and Computation

Time: 2 Hours

Max. Marks :70

PART –A

Note : Answer any Five Questions

(5x2 = 10 Marks)

1 Construct DFA that accepts all strings of a's and b's where each string starts with 'a' and ends with 'ab' over alphabet {a,b}.
2 State pumping lemma for regular languages.
3 Define PDA and the languages accepted by a PDA.
4 Give grammar for the language $L(G) = 0^n 1^n | n \geq 1$.
5 What are the Normal forms of CFGs?
6 What is undecidability?
7 Define inherent ambiguity.
8 What are the reasons for a TM not accepting its input?
9 What are the types of Turing machines?
10 What do you mean by Recursively enumerable languages?

PART-B

Note : Answer any Four Questions

(4 x 15 = 60 Marks)

11. a) Construct a DFA

		0	1
→	qo	{qo,q1}	{q0}
	q1	Φ	{q2}
	qo	Φ	{q3}
*	qo	{q3}	{q3}

b) Construct an NFA equivalent to the regular expression 10 + (0+11) 0*1 with epsilon-transitions.

12. (a) Design a PDA recognizing the set L of all non-palindromes over {a, b}.
    (b) Convert the grammar S → aSb/ab into Chomsky Normal Form.
    [5]

13. (a) Give the new set of productions after removing the unit productions from the following CFG.
    S → AA, A → B / BB, B → abB / b/ bb.
    (b) Show that the set of palindromes over {0, 1} is not regular using pumping lemma.

14. a) Convert the following grammar to CNF.

    S → aAa | aBC
    A → aS | bD | ε
    B → aBa | C | b
    C → abb | DD
    D → aDa

    b) State pumping Lemma for CFL's. What are its applications?

15. Design a TM to accept $a^n b^n c^n / n \geq 1$.

16. a) Construct a TM to accept the language of palindromes over the alphabet {a, b}.
    b) Explain Halting problem of a TM.

17. Give short notes on the following:
    a) CHOMSKY hierarchy
    b) Recursive and Recursive enumerable languages.

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