Dronacharya College of Engineering, Gurgaon

Department of Electronics and Computers Engineering

Subject: Theory of Automata Computation **(CSE-206-F)** **Semester: VI/ Branch:** ECS

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Short Answer Questions

Section A

1. Write any three applications of Automata Theory.
2. Define Finite Automation
3. Define Deterministic Finite Automation with example.
4. Define NFA with € transition
5. Explain a transition diagram
6. What is a regular expression? Explain with example.
7. How the kleen's closure or closure of L can be denoted?
8. How do you represent positive closure of L?
9. Write the regular expression for the language accepting all combinations of a's over the set $\sum = \{a\}$
10. Write down the relationship between FA and regular expression.
11. State Arden's theorem.

Section B

1. Explain the application of the pumping lemma.
2. Let G = ({S,C}, {a,b}, P,S} where P consists of S $\rightarrow$ aCa, C $\rightarrow$ aCa, Find L(G))?
3. Define a derivation tree for CFG.
4. Construct CFG L= { $a^n b^n$; n≥1}.
5. Write a CFG for the set of strings which does not produce any palindromes.
6. Find the derivation tree for the grammar G = ({S, A, B}, {a,b}, P, S}
   Where P is given by:
    S $\rightarrow$ Aa / bB
    A $\rightarrow$ab
    B $\rightarrow$ aBb / a
7. What are the two major normal forms for context-free grammar?
8. How do you simplify the context-free grammar?
9. Define CNF and GNF.

Section C

1. Define pushdown automaton.
2. What are the different ways of language acceptances by a PDA and define them
3. Construct a PDA that accepts the language generated by the grammar
   S→ aSbb / aab
4. How do you convert CFG to a PDA
5. Define Deterministic PDA
6. Is it true that NDPDA is more powerful than DPDA? Justify your answer
7. What is a Turning Machine? How do you write the definition of TM in mathematical form?
8. What is multidimensional Turing Machine?

Section D

1. When a language is said to be recursively enumerable?
2. When a language is said to be recursive?
3. What is diagonalization language?
4. Define decidability (or) decidable problems?
5. Define Undecidable problem?
6. What are the properties of recursive enumerable sets which are undecidable?
7. What are the properties of recursive and Recursively Enumerable Language?