

**2016**

Time : 3 hours

Full Marks: 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from **all** the Groups as directed.

**Group – A**

1. State whether the following statements are 'True' or 'False':

1 x 15 = 15

- a) In a finite language no string is pumpable.
- b) A DFA has infinite number of states.
- c) In DFA all states have same number of transitions.
- d) Every subset of a regular language is regular.
- e) Every context-free language has a context-free grammar in Chomsky normal form.
- f) If A is a context-free language then A must be non-regular.
- g) Every language is Turing-recognizable.
- h) The set of all languages over an alphabet is countable.
- i) If a language A has an NFA, then A is non-regular.
- j) If a language A has a regular expression, then it also has a context-free grammar.
- k) If a language A has a PDA, then A is generated by a context-free grammar in Chomsky normal form.

- l) A is if a language regular, then it A must be finite.
- m) The regular expressions  $(a \cup b)^*$  and  $(b^*a^*)^*$  generate the same language.
- n) The class of context-free languages is closed under intersection.
- o) The language  $\{ 0^n1^n \mid 0 \leq n \leq 1000 \}$  is regular.

### Group – B

Answer any **five** questions of the following: 4x5=20

2. What is the formal language? Define it.
3. Define Generalized Transition Graph.
4. What is Associativity and Commutativity?
5. Explain pumping lemma for Regular Language.
6. Write the Closure Properties of Regular Languages.
7. Construct a PDA for the regular expression  $r = 0^* 1^+$ .

### Group – C

Answer any **five** questions of the following: 7x5=35

8. Explain pushdown automata and context-free grammars. Give the example of construction of PDA equivalent of a CFG.
9. What is Relation? Write all properties of the Relation.
10. Design a Turing machine which compute the function f  
 $f(m) = m + 1$  for each  $m$  that belongs to the set of natural numbers.
11. Write the simple notations for deterministic finite automata.
12. Explain inherent ambiguity in grammar.
13. Write the rules of inference for propositional calculus.
14. Explain finite automata and regular expression.

.....\*

For more questions visit: <https://www.guptatreepoint.com/marwari-college-previous-year-question-paper/>

WWW.GUPTATREEPOINT.COM