

2017

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 are directed.

Group – A**(Compulsory)**1. True **or** False:

1x15=15

- a) A DFA can have more than one accepting state.
- b) Let $L_4 = L_1L_2L_3$. If L_1 and L_2 are regular and L_3 is not regular, it is possible that L_4 is regular.
- c) In a finite language no string is pumpable.
- d) Every context-free language has a grammarian Chomsky normal form.
- e) Every language is Turing-recognizable.
- f) If a language is context-free, then it must be Turing-decidable.
- g) The problem of determining if a context-free grammar generates the empty language is undecidable.

- h) The problem of determining if a Turing machine recognizes the empty language is undecidable.
- i) The set of all languages over an alphabet is not countable.
- j) Non-regular languages are recognized by NFAs.
- k) The class of context-free languages is closed under intersection.
- l) A language has a regular expression if and only if it has an NFA.
- m) If A is a context-free language and B is a language such that B is a subset of A, then B must be a context-free language.
- n) If a language A has an NFA, then A is non-regular.
- o) The regular expressions $(a \cup b)^*$ and $(b^* a^*)^*$ generate the same language.

Group – B

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

2. Explain the Graph. How it is differ from Tree?
3. What is String? Writes its properties.
4. Write the properties of transition system.
5. Explain regular set and regular grammar.
6. Write the Application of Pumping Lemma.
7. Construct a PDA accepting the following language:
 $\{0^n 1^{2^n} / n \geq 1\}$

Group – C

Answer any **five** questions of the following:

7x5=35

8. Explain the Turing machine as physical computing device.
9. Write the rules of inference and predicate calculus.
10. Prove that $L = \{a^n b^n \text{ where } n \text{ is square and } n > 0\}$ is non-regular.
11. Explain the pumping lemma for regular language.
12. Explain the grammar. Write the CFG for the regular expression $r = (a + b)^*$.
13. Explain set, relation and function in brief.
14. Define the Chomsky classification of Language and give the example.

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