NO. OF QUESTIONS: 16
NO. OF PAGES : 01

**BG 5th SEMESTER**

March-April, 2021

# Theory of Computation (BCA)

**Time Allowed : 2.00 Hours**

**Max. Marks : 60**
**Min. Marks : 24**

**NOTE :** ATTEMPT ALL QUESTIONS FROM SECTION "A" & "B" AND ONLY TWO QUESTIONS FROM SECTION "C"

## SECTION – A: [Short Answer Type Questions, to be answered in about 20 words] (8 x 3 = 24 Marks)

1. What is finite Automata?
2. If the length of string is 5. What is the possible number of substrings?
3. What is a Type 3 and type 2 grammars?
4. For a string of length n, what are the possible number of prefixes and suffixes?
5. What is the full form of
   a. GNF b) CFL c) CSG d) CNF e) NFA
6. What is a transition function?
7. What do you mean by decidability?
8. For a string of length greater or equal to n, what is the minimum number of states?

## Section – B : [Medium Answer Type Questions, to be answered in about 150 words] (4 x 5 = 20 Marks)

9. What is a Grammar? What are the various types of grammars?

"OR"

Differentiate between DFA and NFA. Design a DFA which accepts strings starting with 'a' and ending with 'b'?

10. What is a regular language and Grammar? What are the properties of Regular languages?

"OR"

What is a Push down automata? What are the various operations performed under the transition function of PDA?

11. What is a context free grammar? Consider a grammar G having production {S → aSa/bSb/x}. Check the production and find the language generated?

"OR"

What are the properties of context free grammars? Also write down the steps for simplification of CFG?

12. Convert the given grammar into GNF {S → AB , A→ aA/bB/b, B → b}

"OR"

What is parsing? Explain Top down and bottom up parsing?

## Section – C : [Long Answer Type Questions, to be answered in about 300 words] (2 x 8 = 16 Marks)

13. What are the types of states used to design a DFA and an NFA? Also write down the steps for conversion of DFA into NFA and vice versa?
14. Explain the model of a Turing machine? Design a TM which accepts a language $L=\{a^n\ n>=1\}$.
15. Design a TM which accepts a language $L=\{a^n b^n, n>=1\}$.
16. Compare and contrast Recursive and Recursively Enumerable language?

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