D 71666 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CUCBCSS—UG)

B.C.A.

BCA 3C 06—THEORY OF COMPUTATION

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *the questions.*

Each question carries 1 *mark.*

1. What is an automaton ?
2. What is yield ?
3. Define subjective function with example.
4. What are the components of a finite automaton ?
5. Define PDA.
6. What is regular grammar ?
7. Define Function.
8. Define relation with example.
9. Find the regular expression for the set of all strings containing at most 2a's if alphabet set is $\{a, b\}$.
10. What is a moore machine ?

(10 × 1 = 10 marks)

Section B

Answer **all** *the questions.*

Each question carries 2 *marks.*

11. Find R + if $R = \{(a, b), (b, c), (c, a)\}$.
12. What is a graph ? How a graph represented ?
13. Explain the closure properties of a regular set.
14. Find the sets represented by the regular expression $a + b\,(a + b)^*$.

Turn over

15. Explain Type 1 grammar and Type 2 grammar with example.

16. Find the right most derivation for the string 00110101 if grammar

    G is $S \to 0B \mid 1A$, $A \to 0 \mid 0S \mid 1AA$, $A \to 1 \mid 1S \mid 0BB$.

17. Explain the properties of a transition function.

18. Prove that the number of vertices in a binary tree is odd.

(8 × 2 = 16 marks)

Section C

Answer any **six** *questions.*
Each question carries 4 *marks.*

19. Find $L(G)$, if $G = (\{S\}, \{0,1\}, \{S \to 0S1, S \to \wedge\})$.

20. Explain ambiguity in CFG with example.

21. Prove the Pigeonhole principle by induction.

22. Explain the steps for construction of minimum automaton.

23. Write different methods for representing Turing Machines.

24. Explain Strings and their properties.

25. How can we eliminate $\wedge$-moves from a transition system ?

26. Explain Arden's theorem .

27. Prove that, If L is regular then L^T also regular.

(6 × 4 = 24 marks)

Section D

Answer any **three** *questions.*
Each question carries 10 *marks.*

28. Explain about Parsing and different types of Parsing.

29. Prove that, For every NDFA there exist a DFA which simulates the behaviour of NDFA.

30. Find a grammer in GNF equivalent to the grammer, $E \to E + T \mid T, T \to T^* F \mid F, F \to (E) \mid a$.

31. Explain simplification of Context Free Languages.

32. Explain Chomsky classification of languages.

(3 × 10 = 30 marks)