

D 91725

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Name.....

Reg. No.....

**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020**

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 a transition system ?
2. What is a mealy machine ?
3. Explain relations. What are its properties ?
4. Define one-to-one function with example.
5. Define grammar.
6. What is yield ?
7. Define digraph.
8. What is derivation tree ?
9. Find the regular expression for the set of all strings containing exactly 2a's if alphabet set is {a, b}.
10. What are the properties of a relation ?

(10 × 1 = 10 marks)

Section B

Answer all the questions.

Each question carries 2 marks.

11. Define five postulates on binary operations.
12. Find the sets represented by the regular expression $(a + b)^*(aa + ab + bb + ba)^*$.
13. Explain tree and its properties.
14. Define PDA.

Turn over

15. What are the properties of transition functions ?
16. Find the derivation tree for the string 00110101 if grammar

G is $S \rightarrow 0B|1A$, $A \rightarrow 0|0S|1AA$, $A \rightarrow 1|1S|0BB$.

17. Define Turing Machine.
18. Explain various ways of describing a Set.

(8 × 2 = 16 marks)

Section C

Answer any six questions.

Each question carries 4 marks.

19. Explain Chomsky classification of languages.
20. Write the steps for construction of top down parser.
21. Show that the grammar G is ambiguous if $S \rightarrow SbS|a$.
22. Find $L(G)$, if G is $S \rightarrow aS|bS|a|b$.
23. Prove that the theorem : A tree with n vertices has $(n - 1)$ edges.
24. Explain about Non Deterministic Finite State Automaton.
25. What are the identities for regular expression ?
26. Explain bottom up parsing with suitable example.
27. Explain ambiguous grammars with example.

(6 × 4 = 24 marks)

Section D

Answer any three questions.

Each question carries 10 marks.

28. Construct a grammar in Greibach Normal Form equivalent to the grammar $S \rightarrow AA|a$, $A \rightarrow SS|b$.
29. Prove that, If L is the set accepted by NDFSA , then there exists a DFA which also accepts L .
30. Explain Arden's theorem.
31. Write steps for minimization of automata with suitable example.
32. Construct a DFA if the regular expression is $10 + (0 + 11)0^*1$.

(3 × 10 = 30 marks)