THIRD SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2020
(CUCBCSS-UG)
CC17U BCA3 C06 - THEORY OF COMPUTATION
(Complementary Course)
(2017, 2018 Admissions – Supplementary/Improvement)

Time: Three Hours   Maximum: 80 Marks

PART A
Answer *all* questions. Each question carries 1 mark.

1. What is yield of a derivation tree?

2. Length of λ will be --------------

3. Write the regular expression for the set of all strings of 0 and 1ending in 00.

4. All notation in Mealy machine are equal to a Moore machine with only the difference of:

    a) Initial state   b) Output function   c) Output alphabet   d) Input alphabet

5. DPDA stands for --------------

6. Context Sensitive Grammar generates:

    a) Type 0 language   b) Type 1 language   c) Type 2 language   d) Type 3 language

7. Which of the following regular expressions denote a language comprising all possible strings over the alphabet {a, b}?

    a) a*b*   b) (ab)*   c) (a+b)*   d) (a+b*)

8. Which of the following is true?

    a) All NFA are DFA   b) All DFA are NFA

    c) Both (a) and (b)   d) NFA and DFA have different power

9. The temporary storage used in a Turing Machine is --------------

10. Regular languages are closed under

    a) Complementation   b) Star closure   c) Concatenation   d) All of these

                                                                (10 x 1 = 10 Marks)

PART B
Answer *all* questions. Each question carries 2 marks.

11. What do you mean by regular expression?

12. What is derivation tree?

13. Differentiate function and relation.

14. Define parsing.

15. What is graph?

16. Draw the DFA for the language L= $\{(10)^n : n \geq 0\}$.

17. Construct a Context Free Grammar for the language L= $\{a^n b^{2n} : n \geq 0\}$.

18. Differentiate right linear and left linear grammar.

(8 x 2 = 16 Marks)

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

19. Describe tree and its properties.

20. What is Greibach Normal Form? Convert the grammar into GNF: $S \rightarrow aSb / bSa / a / b$

21. Differentiate recursive and recursively enumerable languages.

22. Explain the concept of Turing Machine.

23. What is Mealy Machine? Write down the steps to convert Mealy machine into Moore machine.

24. Briefly explain the closure properties of regular languages.

25. What is ambiguous grammar? Explain with an example.

26. Describe algebraic laws for regular expressions.

27. Explain the conversion of NFA to DFA.

(6 x 4 = 24 Marks)

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

28. What is pushdown automation? Construct a PDA for the language L= $\{a^n b^n : n \geq 0\}$

29. Explain Chomsky classification of languages in detail.

30. Describe different proofing techniques with example.

31. Explain the principle of induction by 'proof by induction' method with example.

32. Explain DFA minimization with suitable example.

(3 x 10 = 30 Marks)

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