



UNIVERSITY OF NORTH BENGAL
BCA Honours 5th Semester Examination, 2020

CC12-BACHELOR OF COMPUTER APPLICATION (52)

THEORY OF COMPUTATION

Full Marks: 60

ASSIGNMENT

The figures in the margin indicate full marks.

Answer any three questions

20×3 = 60

- 1 Define NFA and DFA. Discuss the difference between NFA and DFA. How to convert ϵ -NFA to its equivalent DFA. Explain with example. 20
2. Define regular expression. Construct DFA for the following regular expression $10 + (0+11)0^*1$. 20
3. State Pumping lemma for regular language. Show that the language $L = \{a^n b^n : n \geq 0\}$ is not regular using pumping lemma. 20
4. Define Context free grammar. For the grammar, $G = \{S \rightarrow AaS \mid a, A \rightarrow SbA \mid SS \mid ba\}$, find the leftmost and rightmost derivation for the string aabbaaa. 20
5. (a) Using parse tree show that the grammar : $S \rightarrow S + S \mid S^* S \mid a$ is ambiguous Use $a + a^* a$ as the string. 10
(b) Convert the following Regular expression into FA: $(a + b)^* (aa + bb)(a + b)^*$ 10
6. Prove that the regular language are closed under union, intersection, concatenation and Kleene closure. 20

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