

Tribhuvan University
Institute of Science and Technology
2080
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Bachelor Level / Second Year/ Forth Semester/ Science
Computer Science and Information Technology (CSC.251)
(Theory of Computation)
(OLD COURSE)

Full Marks: 80
Pass Marks: 32
Time: 3 hours.

*Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.*

Attempt all the questions.

Group A

Short Answer Questions

(8×4=32)

1. Define alphabet, string, and Kleen closure.
2. Construct a DFA that accepts strings over {0, 1} that accepts strings having substring 01.
3. How is NFA to DFA conversion done? Illustrate with an example.
4. Write regular expression over {a, b} for following strings;
 - a. Even no of a's and b's
 - b. substrings with aab and bab
5. Define components of CFG.
6. How is Turing Machine different from PDA?
7. What is Turing reducibility?
8. Define non-deterministic PDA with an example.

Group B

Long Answer Questions

(6×8=48)

9. Describe the pumping lemma for a regular expression. Illustrate with an example.
10. Describe with example the minimization of DFA.
11. What is the Chomsky Normal Form? Describe with an example how CFG is converted to CNF.
12. What is an instantaneous description in PDA? Construct a PDA with an empty stack that accepts balanced parenthesis.
13. Define Universal Turing Machine. How is the encoding of Turing Machine done?
14. Write short notes on:
 - a) Undecidability
 - b) Post's correspondence problem