National Institute of Technology, Rourkela
Class Test - I, Autumn 2021
Compiler Design (CS 3007)
5th semester B.Tech in Computer Science & Engineering

Duration: 45 Minutes **Full Marks: 20**
Number of pages: 1

- **Attempt all questions.**
- **For each grammar the capital letters represent non-terminals while lower case letters represent terminals.**

1. In C language - 'a', '\t', '1' and '\n' are examples of character constants. While "CS431", "SSB HALL", "xyz@nitrkl.ac.in" and "10CS9402" are examples of string constants.
   (a) Design an regular expression for such constants. [2]
   (b) Construct a DFA that accepts them. [2]
   (c) Represent the transition system for the obtained DFA using a 2-D array. Explain its pros and cons. [2 + 2]
   (d) Is it possible to have a better representation of the transition system in terms of space ? Explain. [2]
2. Considering the grammar $S \rightarrow aSb \mid \epsilon$, do the followings:
   (a) Design a recursive descent parser. [2]
   (b) Give a trace of deriving the input strings "*aabb*" and "*aabbb*". [1 + 1]
3. Considering the following grammar with A as starting symbol

$$A \rightarrow Bb \mid Cd$$
$$B \rightarrow aB \mid \epsilon$$
$$C \rightarrow cC \mid \epsilon$$

   (a) Verify that the grammar is LL(1). [1]
   (b) Construct the predictive parser table for it. [3]
   (c) Give a trace of deriving the input strings "*aab*" and "*ccd*". [1 + 1]

End