NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
End Semester Examinations – January 2021 Session

DEPARTMENT	: Computer Science and Engineering
DATE & TIME OF EXAM	: 10th May 2021 & 10.00 am
SUB CODE	: CSPC41 – Automata and Formal Languages
SEMESTER & YEAR	: IV / II / A section
DURATION	: 2 hrs
MARKS	: **30 marks**

ANSWER ALL QUESTIONS

1. Design a TM that accepts the language { ww | w € {a,b}* }. (5)

2. Construct TM to implement the rotate right by one, function where the input string is available on the tape in binary over the language {0,1}*
   Example: Input: 01011101 Output: 10101110 (5)

3. Show the following problem is undecidable (5)
   "Given a grammar G and a string 'w' does G generate 'w'?"

4. Construct a grammar in GNF for the following: (5)
   S → bEf
   E → bEc | GGc
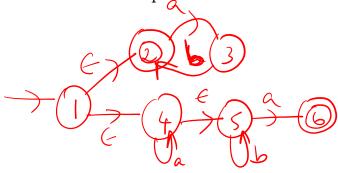   G → b | KL
   K → cKd | ε
   L → dLe | ε

5. Construct a PDA for the following language using empty stack: (4)
   {$a^i\,b^j\,c^k$ | i = j or i = k }

6. Convert the following E-NFA to Regular expression by converting to a NFA, DFA as intermediate steps. (6)

Best Wishes