End Term Assessment– May 2020
Semester –IV
(B.Tech-CSE -(BDA/ CMBA/ DS AI))

Subject Code: CS 2004 / CS0204 **Duration: 2 hours (including time for uploading)**
Subject Name: Theory of Computation **(10 Minutes Max Grace time)**
Max. Marks: 50

Instructions:

- **Write name and registration number, page number on all the pages, convert into one PDF, tag it with your registration number_Name_subject code_subject title.**
- **The Assessment consists of 2 sections**
  - **Part A contains 10 questions of 2 marks each and all questions are compulsory.**
  - **Part B consists of 4 questions of 10 marks each, out of which 3 questions to be attempted.**
- **Hand written responses to be submitted/uploaded as scanned pages of answer sheets (max. 5 pages) within the mentioned duration. DON'T EXCEED THE WORD LIMIT AND UPLOAD PDF TIMELY.**

PART – A

2 * 10 =20 Marks (Each answer- Word Limit- 50 Words)

1. Which FA has QXΣ→2^Q as a transition function and why?
2. Construct an NFA for the regular expression 01*+1.
3. Why we don't want an ambiguous grammar?
4. What is the procedure to eliminate the nullable production?
5. Define regular grammar. Which type of grammar is it?
6. Explain the mapping of transition function of PDA.
7. What does the ID of a PDA represents?
8. Mention the automaton's which have external memory.
9. Which problem determines the answer of some instance of problem in yes or no? Explain.
10. Explain recursively enumerable language.

PART – B

3*10 = 30 Marks (Each answer- Word limit- 250 words)

11. Convert the following NFA with Ɛ- moves to NFA without it: i) δ (q0, 0)→ q0 ii) δ (q0, Ɛ)→ q1
iii) δ (q1,1)→ q1 iv) δ (q1, Ɛ)→ q2 v) δ (q2, 2)→ q2

12. Convert the following grammar G= ({A_1, A_2, A_3}, {a,b}, P, A_1) into GNF where P is:
A_1→ A_2A_3 A_2→A_3A_1|b A_3→A_1A_2|a

13. Construct a turing machine to perform proper subtraction. Draw diag. and ID's.

14. Construct a PDA (diag and tuples also) from CFG G where productions are: δ (q0, a, z0)→(q0, a z0) , δ (q0, a, a)→(q0, a a) , δ (q0, b, a)→(q1, Ɛ) , δ (q1, b, a)→(q1, Ɛ) , δ (q1, Ɛ, a)→(q1, Ɛ) , δ (q1, Ɛ, z0)→(q1, Ɛ)