



# TONTADARYA COLLEGE OF ENGINEERING

(Department of CSE)

## Internal Assessment – III (18CS54)

Subject : ATC  
Semester : V

Date : 02-02-2022  
Time : 12.00pm to 1.300 pm

Answer following questions choosing one question from each part

Total Marks: 50

### PART-A

CO

Q1

- a) Design a PDA for the following language:  $L = \{ww^R \mid w \in \{a,b\}^*\}$ . Also, draw the transition diagram for the constructed PDA. Write the instantaneous description (ID) for the string 'abbbba'. 13M 105
- b) Define a deterministic PDA (DPDA) Also, design a DPDA along with transition diagram for the following language:  $L = \{a^n b^n \mid n \geq 0\}$ . 12M 105

### OR

Q2

- a) For following grammar  
 $S \rightarrow ASB \mid \epsilon$   
 $A \rightarrow aAS \mid a$   
 $B \rightarrow SbS \mid A \mid bb$   
Eliminate  $\epsilon$ -production, useless symbols and unit productions. 13M 105
- b) Construct PDA for the given CFG, and test whether 0104 is acceptable by this PDA.  
 $S \rightarrow 0BB$   
 $B \rightarrow 0S \mid 1S \mid 0$  12M 105

### PART-B

Q3

- a) Define a Turing Machine and explain with neat diagram, the working of a basic Turing Machine. Obtain a TM to accept the language containing strings of 0's and 1's ending with 011 12M 106
- b) Design TM that accepts  $\{0^n 1^n \mid n \geq 1\}$ . Obtain the computation for 0011 and 010. 13M 106

### OR

Q4

- a) Write a short note  
i) Halting Problem ii) Church-Turing thesis iii) Post's Correspondence 13M 106
- b) Design TM that accepts  $\{1^n 2^n 3^n \mid n \geq 1\}$ . Write the ID's for 1223 12M 106

Course Outcome	Complete Title
CO5	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
CO6	Classify a problem with respect to different models of computation