Roll No. | | | | | | | | | | | | |  Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (2012 to 2017) (Sem.–7,8)

# THEORY OF COMPUTATION

Subject Code : BTCS-702

M.Code : 71894

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.**

## SECTION-A

**Answer Briefly :**

Q1. Define Mealy and Moore machines.

Q2. Define the term acceptability of a string.

Q3. Define pumping lemma for regular sets.

Q4. Differentiate between left linear and right linear regular grammar.

Q5. Define yield and ambiguity in CFG.

Q6. Give example CNF and GNF productions.

Q7. Differentiate between deterministic and non-deterministic PDA.

Q8. Give rules for converting CFG to PDA.

Q9. Give instantaneous description of Turing machine.

Q10. What do you mean by halting problem of TM?

## SECTION-B

Q11. Construct a DFA equivalent to :

$M = \left(\{q_0, q_1, q_2, q_3\}, \{0,1\}\right), \delta, q_0, \{q_3\}$, where δ is given by following state table :

| State/Σ | **a** | **b** |
|---|---|---|
| $\rightarrow q_0$ | $q_0, q_1$ | $q_0$ |
| $q_1$ | $q_2$ | $q_1$ |
| $q_2$ | $q_3$ | $q_3$ |
| $q_3$ | | $q_2$ |

Q12. Explain in detail the Chomsky classification of languages.

Q13. Define regular sets and write its closure properties.

Q14. Prove that P + PQ*Q = a*bQ* where P = b + aa*b and Q is any regular expression Describe **any two** representation of TM.

Q15. Find a reduced grammar equivalent to the given grammar.

$$S \rightarrow AC \mid B, A \rightarrow a, C \rightarrow c \mid BC, E \rightarrow aA \mid e$$



## SECTION-C

Q16. Find a grammar in GNF equivalent to the grammar

**E → E + T | T** **T → T * F | F** **F → (E) | a**

Q17. Design Turing Machine of $\{0^n1^n \mid n \geq 1\}$.

Q18. Describe PDA with its representations. Also write rules of converting PDA to CFG.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**