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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 :

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

State/ $\Sigma$	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.

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

## SECTION-C

Q16. Find a grammar in GNF equivalent to the grammar

$$E \rightarrow E + T | T$$

$$T \rightarrow T * F | F$$

$$F \rightarrow (E) | a$$

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

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.**