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

Total No. of Questions : 18

MCA (E-I) (2015 to 2018) (Sem.–3)

THEORY OF COMPUTATION

Subject Code : MCA-305B

M.Code : 74078

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students have to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

Q1 a) Discuss one-one onto function by taking suitable example.

b) Prove that $\sum(n-1=\frac{n(n-1)}{2})$ using mathematical induction.

Q2 Design an automaton accepting all the strings ending with bb. Where $\{a,b\} \in \sum$.

SECTION-B

Q3 a) Construct a DFA for the regular expression (0+10)* 101(0+10)*.

b) Design a DFA accepting language $L = \{a^n bb \mid n \geq 1 \& \{a,b\} \in \sum\}$

Q4 Construct a CFG for $L = \{a^n b^m c^p \mid n+m=p, p>1 \& \{a,b,c\} \in \sum\}$

SECTION-C

Q5 Explain the following :

a) Ambiguity in CFG

b) DPDA

Q6 Show that language L = [$a^n b^n c^n$ | n ≥ 0 & {a,b,c} ∈ Σ } is not context free

SECTION-D

Q7 Design a Turing Machine which recognizes palindromes over {0,1}.

Q8 Explain the following :

a) Multitape Turing Machine

b) Chomsky Hierarchy

SECTION-E

Write briefly :

Q9 State pumping lemma for regular languages.

Q10 Discuss the concept given by Arden's theorem.

Q11 What is meant by regular expression?

Q12 Define a Derivation Tree for a CFG.

Q13 What are two normal forms for a CFG?

Q14 Define Acceptance of PDA by Empty Stack.

Q15 What is halting problem of Turing Machine?

Q16 Compare PDA and TM.

Q17 Write two properties of recursively enumerable languages.

Q18 Define NP complete problem.

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.