B.Tech. SEM -V Info. Tech. 2014 Course (CBCS) : SUMMER - 2019

SUBJECT: THEORY OF AUTOMATA AND FORMAL LANGUAGE

Day: Thursday
Date: 09/05/2019

S-2019-2677

Time: 10.00 AM TO 01.00 PM
Max Marks. : 60

N.B. :

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data, if necessary.
4) Use of non-programmable calculator is allowed.
5) Draw neat and labeled diagrams wherever necessary.

Q.1 Design a finite Automaton recognizing $(0+1)^*$ 1.0. Draw transition graph and transition table. **(10)**

OR

Q.1 Design a finite automaton for $\sum = \{a, b\}$ containing either string ab or bba. **(10)**

Q.2 Prove that the language $L = \{a^n b^{n+1} \mid n > 0\}$ is non-regular using pumping lemma. **(10)**

OR

Q.2 Construct NFA for $0.1[((1.0)^+ + 111)^* + 0]^*1.0$. **(10)**

Q.3 Consider following rules. **(10)**

$S \rightarrow ab \mid ba, \quad A \rightarrow aS \mid bAA \mid a, \quad B \rightarrow bS \mid aBB \mid b$

For the string aaabbabbba find:

i) the leftmost derivation
ii) the right most derivation
iii) parse tree

OR

Q.3 Construct a grammar in GNF equivalent to the grammar $S \rightarrow AA / a$ *and* $A \rightarrow SS / b$. **(10)**

Q.4 Draw PDA accepting language **(10)**

$L = \{a^{2n} \mid n > 0\}$

OR

Q.4 Write a short on application of PDA in expression conversion. **(10)**

Q.5 Design TM to find GCD of two given numbers. **(10)**

OR

Q.5 Explain Halting problem of Turing Machine. **(10)**

Q.6 What is Church –Turing hypothesis? **(10)**

OR

Q.6 Explain application of minimization of grammar rules in detail. **(10)**

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