EV-9

M.C.A. IInd Semester (New) Examination, 2021

Theory of Computation

Paper - MCA - 203

[Maximum Marks : 100

Note :- All questions from each section carry equal marks. All questions are compulsory and answer limit are approximately 250 words. Start the answer of each section from new page. Maximum limit of pages of answer booklet are approximately 16 pages. Answer should be written by the student in his/her own handwriting mandatory. The first page of answersheet should be download by the student from university website www.bubhopal.ac.in is mandatory.

1. (a) Prove the equivalence of NFA and DFA using subset construction method.
   (b) Draw NFA for :-
       (i) Numberof 2's multiple of 4
       (ii) Number of 2's not multiple of 5

2. (a) Explain pumping lemma and prove language is not regular
       $L = \{0^{m/n} 0^{m+n} \mid m \geq 1 \text{ and } n \geq 1\}$
   (b) Construct CFG for the language of palindeome string over (a, b).

3. (a) Differentiate PDA accpetance by empty stack method with accptance by final state method.
   (b) Prove language $\{0^{n/n} 2^n \mid n \geq 1\}$ is not context free language.

4. (a) Remove '$\in$' from the following grammar :
       $S \rightarrow ASA / aB / b$
       $A \rightarrow B$
       $B \rightarrow b / \in$
   (b) Write note on chomasky hierarchy of grammar.

5. (a) Construct PDA for $L = \{a^n b^n \mid n \geq 0\}$
   (b) How does a primitive recursive function help to identify computable function ?

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