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**I Semester MCA Degree Examination, July - 2022**

**COMPUTER SCIENCE**

**Theory of Computation**

**(CBCS Y2k20 Scheme)**

**Paper : 1MCA4**

**Time : 3 Hours**

**Maximum Marks : 70**

**Instructions to Candidates:**

- 1) Answer any **FIVE** questions from **Part - A**.
- 2) Answer any **FOUR** full questions from **Part - B**

**PART - A**

Answer any **FIVE** questions.

**(5×6=30)**

1. Define DFA and NFA. Explain differences between NFA and DFA. (6)
2. What is Regular expression? Prove that regular languages are closure under intersection? (6)
3. Define deterministic Push down Automata. Explain with example. (6)
4. Explain different types of Turing machines. (6)
5. Design a DFA to accept binary strings divisible by 3. and verify '1010' string is accepted or rejected. (6)
6. Explain chomsky's hierarchy of languages. (6)
7. Prove that complement of recursively enumerable language is recursive. (6)
8. Eliminate unit productions from the grammar: (6)
  - $S \rightarrow Aa / B / Ca$
  - $B \rightarrow aB / b$
  - $C \rightarrow Db / D$
  - $D \rightarrow E / d$
  - $E \rightarrow ab$

**[P.T.O.]**