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GIET UNIVERSITY, GUNUPUR – 765022
M. C. A (Third Semester) Examinations, December' 2020
MCA304 – Theory of Computation
(MCA)

Time: 2 hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A (2 x 10 = 20 Marks)

Q.1. Answer *ALL* questions

- Define Deterministic Finite Automation.
- Define Finite Automation.
- Define NFA with ϵ transition.
- State regular expression.
- What are the uses of Context free grammars?
- Define Pushdown Automata.
- What is a Turing machine?
- What are (a) recursively enumerable languages (b) recursive sets?
- Define PCP or Post Correspondence Problem.
- When we say a problem is decidable? Give an example of undecidable problem?

PART – B (5 x 6 = 30 Marks)

Answer *ANY FIVE* questions

Marks

- | | |
|---|---|
| 2. Design a DFA to accept the language $L = \{w/w \text{ has both an even no of } 0\text{'s \& an even number of } 1\text{'s}\}$ | 6 |
| 3. Explain about Conversion of NFA to DFA with suitable example. | 6 |
| 4. Using pumping lemma for the regular sets, prove that the language $L = \{ a^m b^n / m > n \}$ is not regular. | 6 |
| 5. Construct CFG without ϵ production from : $S \rightarrow a \mid Ab \mid aBa$, $A \rightarrow b \mid \epsilon$, $B \rightarrow b \mid A$. | 6 |
| 6. State and explain the properties of CFL? | 6 |
| 7. Construct the grammar for the language $L = \{a^n b a^n \mid n \geq 1\}$. | 6 |
| 8. Describe in detail about NP-Hard and NP-Complete problems with example. | 6 |
| 9. State the post correspondence problem and prove that it is Undecidable. | 6 |

--- End of Paper ---