G 2345

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Reg. No..............................

Name.................................

B.TECH. DEGREE EXAMINATION, MAY 2008

Seventh Semester

Branch : Computer Science and Engineering

THEORY OF COMPUTATION (R)

(2002 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 marks.

1. Differentiate Deterministic and Non-Deterministic Automata.
2. What is primitive recursive function ?
3. Show that $\sum_{i=0}^{n} i = \frac{n(m+1)}{2}$ by induction.
4. State pumping lemma for content free languages.
5. Construct automata to accept $1(1+0)^* + a(a+b)^*$.
6. What is the acceptance concept of Push Down Automata?
7. Explain two normal forms of content free grammar.
8. Explain Church's Thesis.
9. Cite example for NP hard problem.
10. What is a multi-head Turing Machine?

($10 \times 4 = 40$ marks)

Part B

Answer **all** *questions.*

Each question carries 12 marks.

11. (a) For any finite set A, $|2^A| = 2^{|A|}$, is cardinality of any power set A is 2 raised to a power equal to cardinality of A.

    (b) Explain algorithm for the minimizing of a DFA.

Or

12. (a) Construct DFA for the language given by

    $$L = ((a+b)^* ab (a+b)^*) \cap L^1 ((ab)^*)$$

    (b) Explain Chomsky classification.

13. (a) Design a minimum state FSA to recognize the expression $(111/000)^* 0$.

    (b) Show that ($0^{n/n}$ is prime) is not content free.

Turn over

Or

14. (a) Is the language $\{0^m/1^n\ 0^{m+n/m} \geq 1$ and $m \geq 1\}$ is regular? Praise the answer.

    (b) Construct automaton that accepts language $S \rightarrow aA$, $A \rightarrow abB/b$, $B \rightarrow aA/a$.

15. (a) Construct PDA for the language $L = \{x \in (a, b)^* \,/\, n_a\,(x) > n_b\,(n)\}$.

    (b) Explain applications of PDA.

Or

16. Construct PDA equivalent to the grammar $S \rightarrow aAA$, $A \rightarrow aS/bS/a$.

17. Construct a Turing Machine that accept the Language given by $\{WW^R \,/\, W$ is in $(0 + 1)\}$.

Or

18. Explain Universal Turing machine and explain its applications.

19. Prove that Travelling Sales Man's Problem (TSP) is NP-complete.

Or

20. Show that the halting problem is undecidable.

(5 × 12 = 60 marks)