

F 3331

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2007

Seventh Semester

Branch : Computer Science and Engineering

THEORY OF COMPUTATION (R)

(Regular/Supplementary)

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Define countabilities and uncountability.
2. Write regular expression of set of strings with even number of a 's followed by odd number of b 's.
3. Show that the class of languages accepted by finite automata is closed under union.
4. What are useless symbols and how they can be removed ?
5. Explain properties of regular sets.
6. Define content free language.
7. How to classify the languages ?
8. What is halting problem of Turing machine ?
9. What is Turing computability ?
10. Explain classes P, NP and NP completeness.

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each question carries 12 marks.

11. (a) Check whether the language $L = \{a^n b^n / n \geq 1\}$ is regular or not. Justify your answer.
(b) Explain diagonalization principle.

Or

12. (a) Construct NFA for $01^* + 1$.
(b) Explain primitive recursive and partial recursive function.

Turn over

13. (a) Construct an automation accepting language generated by grammar $S \rightarrow aA/a$, $A \rightarrow abB$, and $B \rightarrow bS$.
(b) State and prove Pumping Lemma for regular languages.

Or

14. (a) Construct DFA for language L over the $\Sigma = \{0, 1\}$ and α is set of strings ending with "00".
(b) Convert CFG to NDFA for $S \rightarrow ABaC$, $A \rightarrow BC$, $B \rightarrow b/E$, $C \rightarrow D$, $D \rightarrow d$.
15. Construct PDA to accept the language given by $\{w \in (a, b)^*/w \text{ has the same number of } a\text{'s as that of } b\text{'s}\}$.

Or

16. Is $\alpha = \{0^n/n \text{ is prime}\}$ is content free or not. Prove the answer.
17. Design a Turing machine that recognize the language $\{w/w \text{ is in } (a + b)^*\}$.

Or

18. What is Church's Thesis and Godelization ?
19. Explain algorithmic complexity and NP hard problems.

Or

20. What is integer programming and show how it is a NP-complete problem ?

(5 × 12 = 60 marks)