

G 1116

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Computer Science and Engineering

THEORY OF COMPUTATION (R)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

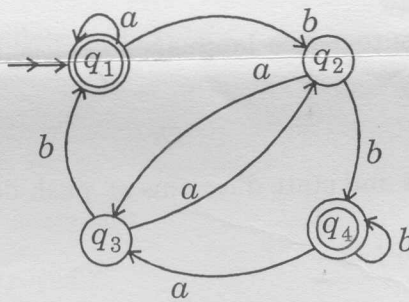
Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 4 marks.

1. Differentiate primitive recursive and partial recursive functions.
2. Give the formal representation of languages.
3. Given the following state diagram of DFA :



Identify :

- (i) Start state and set of accept states.
- (ii) Sequence of states that the machine go through on input $aabb$.
4. Prove that every NFA can be converted to an equivalent one that has a single accept state.
5. Define ambiguity. Give a grammar that is ambiguous and specify the ambiguity.
6. State the formal definition of a push-down automaton.
7. Define Turing machine.
8. State Hilbert's problem. How is it solved ?
9. What are tractable problems ? Give example.
10. Differentiate polynomial time algorithms and exponential time algorithms.

(10 × 4 = 40 marks)

Turn over

Part B

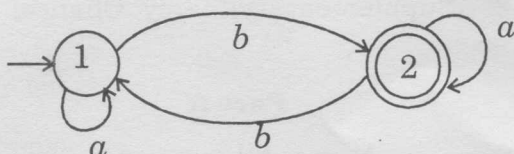
Answer all questions.
Each full question carries 12 marks.

11. Define sets. Explain the properties of set in detail.

Or

12. Elaborate Chomsky classification in detail.

13. Convert the following finite automata into regular expressions. Explain the procedure.



Or

14. Use pumping lemma to show that the following is not regular :

$$A = \{www \mid w \in \{a, b\}^*\}.$$

15. Show that the class of context-free languages is closed under the regular operations, union, concatenation and star.

Or

16. Give informal descriptions and state diagrams of push-down automata for the language :

$$\{w \mid \text{the length of } w \text{ is odd}\}$$

In all parts of the alphabet Σ is $\{0,1\}$.

17. What are multiple turing machines? Prove that "every multi-tape turing machine has an equivalent single-tape turing machine".

Or

18. Define Church-Turing thesis. Elaborate the algorithm and the problem it resolves.

19. Discuss the clique problem. Prove that "CUQUE is in NP".

Or

20. Explain satisfiability problem and Cook-Levin theorem.

(5 × 12 = 60 marks)