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BICS-018

B.Tech. – VIEP – COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

00176

Term-End Examination

June, 2014

BICS-018 : THEORY OF COMPUTATION

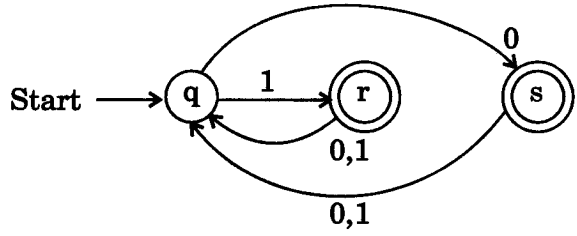
Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions out of ten questions. All questions carry equal marks.*

1. (a) What is a language ? Explain operations on language. *2*

(b) Define a finite state machine and explain model of finite automation. *5*

(c) Find the language accepted by following finite machine. *3*



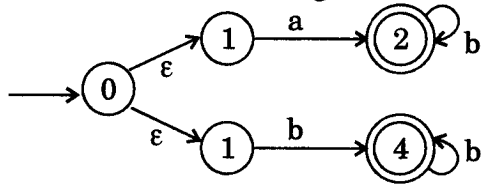
2. (a) Give mathematical definition of NFA and state main difference between NFA and DFA. *5*

(b) Find NFA which accepts the set of all strings over {0, 1} in which the number of occurences of 0 is divisible by 3 and the number of occurences of 1 is divisible by 2. *5*

3. (a) Define NFA ε-Transitions and write the differences between NFA-ε and ordinary NFA. *2*

(b) What is the significance of NFA with ∧-transitions ? Explain. *3*

(c) Describe the language accepted by automata as shown in figure. *5*



4. (a) Construct transition systems equivalent to the regular expression (ab + a)* (aa + b). *5*

(b) Prove the following identity :

(a*ab + ba)* a* = (a + ab + ba)* *5*

5. (a) Construct a DFA accepting language represented by 0*1*2*. *5*

(b) Construct a NFA for the following regular expression (0 + 10* + 01* 0). *5*

6. (a) Define ambiguous grammar and give example. Show that grammar is ambiguous

$$S \rightarrow aSbS \mid bSaS \mid \varepsilon$$ 5

(b) When is a grammar said to be in reduced form ? 5

7. (a) Find the PDA with only one state that accepts the language $\{a^m b^n : n > m\}$ 5

(b) Construct a PDA generating all odd palindromes over string {a, b, c}. 5

8. (a) Describe the Turing machine that accepts the language $L = \{w \in \{a, b, c\}^* / w$ contains equal number of a's, b's and c's$\}$. 5

(b) Explain the importance of Turing machine concept. 5

9. (a) Show that if L and $\overline{L}$ are recursively enumerable, then L is recursive. 2

(b) Explain in detail Church's hypothesis. 5

(c) Write a short note on "Modifications of Turing machines." 3

10. (a) Briefly discuss the problem of travelling salesperson. 5

(b) State and explain the chromatic number problem. 5