



Examination : Second Sessional

Seat No. : _____

Date : 15/02/2014

Day : Saturday

Time : 12.45 to 2.00

Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Define : Distinguishable strings with respect to L. [2]
- (b) Suppose $L \subseteq \Sigma^*$ is a regular language. If every FA accepting L has at least n states, then every NFA accepting L has at least _____ states. (Fill in the blank, and explain your answer.) [2]
- (c) Find all possible languages $L \subseteq \{a,b\}^*$ for which I_L has 3 equivalence classes : the set of all strings ending in b, set of all strings ending in ba, and set of all strings ending in neither b nor ba. [2]
- (d) State True/False with justification: [2]
If $L1 \subseteq L2$ and $L2$ non-regular, then $L1$ is non-regular.
- (e) Ambiguity is a property of the grammar rather than the language. Explain this statement with example. [2]
- (f) Every regular language is a CFL. State True/False with justification. [2]

Q.2 Attempt Any Two from the following questions.

[12]

- (a) Using pumping Lemma show that language L is not a regular language.
 $L = \{xy \mid x, y \text{ belongs to } \{0,1\}^* \text{ and } y \text{ is either } x \text{ or } x^r\}$
- (b) Minimize the Finite Automata given in **Fig 1**.
- (c) Generate a CFG for the language $L = \{a^i b^j c^k \mid i \neq j+k\}$

Q.3 (a) Convert the following Grammar into Chomsky-Normal Form

[6]

$S \rightarrow A \mid B \mid C$
 $A \rightarrow aAa \mid B$
 $B \rightarrow bB \mid bb$
 $C \rightarrow aCaa \mid D$
 $D \rightarrow baD \mid abD \mid aa$

- (b) Convert following NFA- Λ to DFA given in **Fig 2**.

[6]

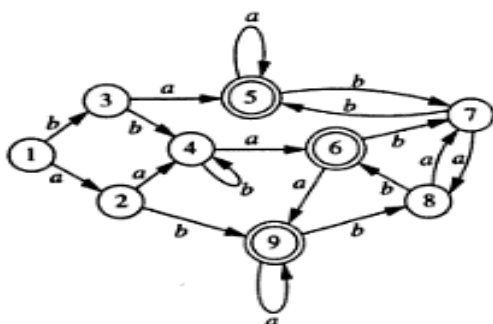
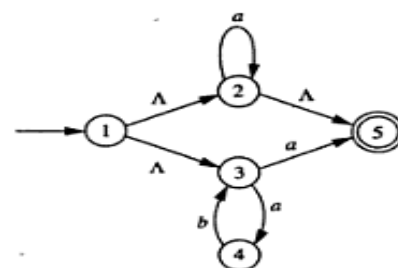
OR**Q.3 (a) State Kleene's theorem Part-I and prove it using structural induction.**

[6]

- (b) Suppose $L1$ and $L2$ are subsets of $\{0, 1\}^*$. Design an FA that accept language $L1 \cap L2$.

[6]

$L1 = \{x \mid x \text{ do not end with } 01\}$
 $L2 = \{x \mid 00 \text{ is not a substring of } x\}$

**Fig 1****Fig 2**