Examination	: Second Sessional	**Seat No.**	: _____
Date	: 19/02/2016	**Day**	: Friday
Time	: 12.30 to 1.45	**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) Using distinguishable string property, find out equivalence classes for $(0+1)*0(0+1)$. **[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 a CFG for the language {w / |w| is odd and its middle symbol is 0}. **[2]**
    (d) State True/False with justification: **[2]**
        If L1 is regular and L2 non-regular, then L1 ∩ L2 is non-regular.
    (e) Describe "Dangling Else" problem. **[2]**
    (f) Define : ^- Closure of a set of states. **[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 / x,y belongs to {0,1}* and y is either x or x^r}
    (b) Minimize the Finite Automata given in **Fig 1**.
    (c) Generate a CFG for the language L={$a^i b^j c^k$ | i< j+k}

Q.3   (a) Let G be the CFG with production rules S→ aS | aSbS | ^ . **[4]**
        (i) Show that G is ambiguous.
        (ii) Find out unambiguous CFG for G.
    (b) Convert following NFA-^ to DFA given in **Fig 2**. **[8]**
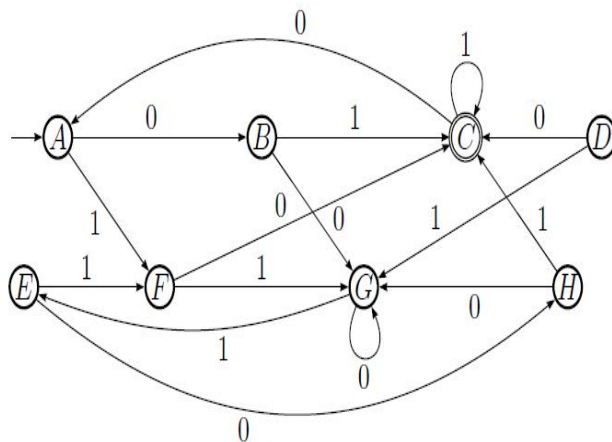   **OR**
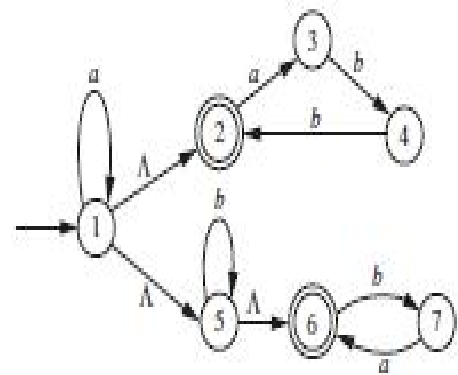**Q.3   (a) Prove that Any regular language is accepted by a finite automaton.** **[8]**
    (b) Construct NFA-^ for $(0+1)(01)*(011)*$ **[4]**

Fig 1

Fig 2