

Total No. of Questions : 6]

SEAT No. :

P46

[Total No. of Pages : 2

**Oct.-16/T.E./Insem.-46**

**T.E. (Information Technology) (Semester - I)**  
**THEORY OF COMPUTATION**  
**(2012 Pattern)**

*Time : 1 Hour]**[Max. Marks : 30**Instructions to the candidates:*

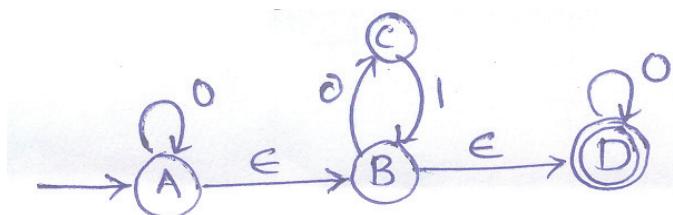
- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

**Unit - I**

- Q1)** a) Give formal definitions for the following [5]
- i) NFA with  $\epsilon$  - transitions
  - ii)  $\epsilon$ -closure
- b) Design an FA over  $\Sigma = \{0,1\}$  for the following [5]
- i) Strings which end in either “00” or “11”
  - ii) Strings which contain either “01” or “110”

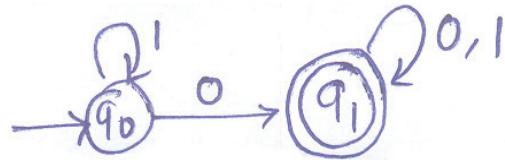
**OR**

- Q2)** a) Compare Moore and Mealy machines with suitable example. [5]
- b) Convert the following NFA- $\epsilon$  to equivalent NFA. [5]

**P.T.O.**

**Unit - II**

- Q3) a)** Construct a Regular Expression corresponding to the following transition diagram using Arden's theorem. [5]



- b) Write a short note on the applications of regular expressions. [5]

OR

- Q4) a)** Construct a DFA that accepts the language represented by  $0^*1^*2^*$ . Make use of NFA. [8]
- b) Define pumping lemma for regular languages. [2]

**Unit - III**

- Q5) a)** Write CFG for the following languages [5]
- $L = \{a^n b^n \mid n \geq 1\}$
  - $(baa + abb)^*$
- b) Simplify the given grammar [5]
- $S \rightarrow aC \mid SB$   
 $A \rightarrow bSCa$   
 $B \rightarrow aSB \mid bBC$   
 $C \rightarrow aBC \mid ad$

OR

- Q6) a)** Define the following with suitable example [6]
- Regular grammar
  - Ambiguous grammar
- b) Convert the following grammar to CNF [4]
- $S \rightarrow Aba \mid aab$   
 $A \rightarrow aS$

