Course:	Theory of Automata	Course Code:	CS-301
Program:	BS(Computer Science)	Semester:	Fall 2017
Duration:	1 Hour	Total Marks:	30
Paper Date:	20-09-17	Weight	17.5%
Section:	A, B, C, D, E, F	Page(s):	6
		Reg. No:	
Exam:	Mid 1	Section:	

Instruction/Notes:

- All the questions are to be attempted on this question paper in given space
- You can use rough sheet but answers and working should be shown on this question paper.
- Don't attach any extra sheet

Question 1 (10 points):

Given NFA in figure 1, create a state diagram of corresponding DFA. Your state diagram should clearly show all 5 attributes of DFA i.e. {Q, Σ, q0,A,δ}

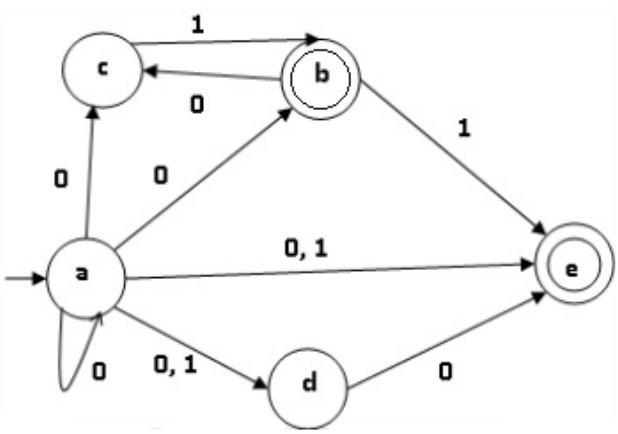

Figure 1 NFA

Question 2: (**10 points**)

Given a DFA M_1 of language L_1 as $\{Q_1, \Sigma_1, q_10, A_1, \delta_1\}$

Define FA N_1 of L_1^R in terms of M_1.

Here L^R mean reverse of language L, for example if L is {a,b}*.b.a then L^R is a.b.{a,b}*

Note1*: You have to give generic Definition not an example.*

Note2: *A_1 is a set of zero or more final states.*

Hint*: N_1 might be NFA-null.*

Question 3: (10 points)

While writing a paragraph in English language certain rules of grammar are to be followed. Some of these rules are given below

- Each paragraph should contain one or more sentence.
- Each sentence should begin with Capital alphabets.
- Each sentence should contain one or more alphabets.
- Each sentence should end with period (.) or question marks (?) punctuations.
- Each punctuation should be followed by a space (␣)
- Space (␣) should NOT come before any punctuation.
- Paragraph cannot contain more than one space (␣) consecutively.
- No two punctuation will occur consecutively.

Create a DFA of GRAMMAR CHECKER that accepts paragraph if all of the above rules are followed otherwise it rejects the paragraph. Your DFA should clearly show all 5 attributes $\{Q, \Sigma, q_0, A, \delta\}$.

Notes:

1. **You don't need to check any rule other than the ones given above**
2. The givens rules are just subset of English grammar rules. We are not checking spelling or sentence structures here.
3. You can take any ***valid*** assumption.
4. There is no restriction on length of paragraph or sentence.