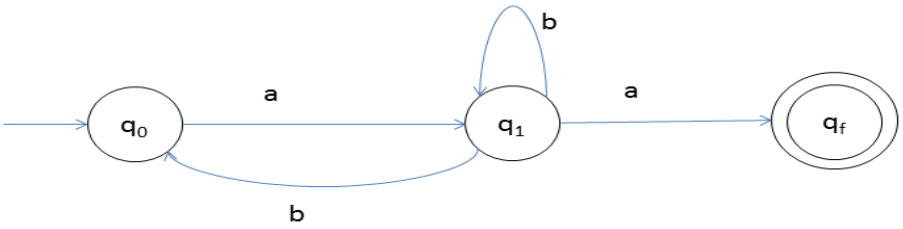
United College of Engineering and Research, Prayagraj
Department of Computer Science & Engineering
I[st] Sessional Examination (2020-2021)
B.Tech. (IV[th] Semester)

Theory of Automata and Formal Language

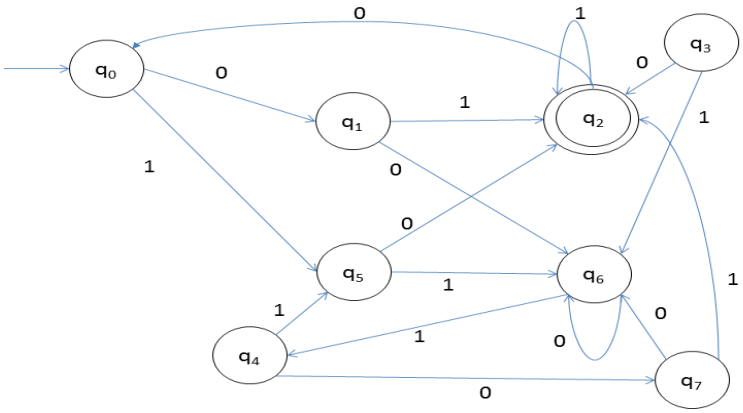
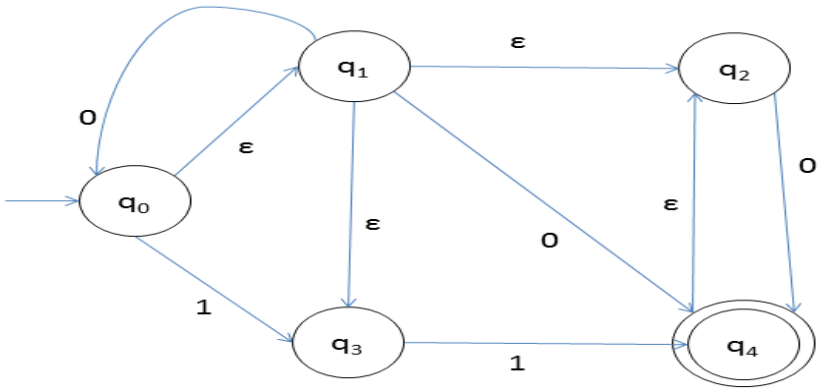
Subject Code: KCS-402:
Time: 1.30 hours **Max. Marks:** 30

Note: There are three sections in this paper. All sections are compulsory.

Q. No.	Question	Marks	CO	Bloom's level
	Section-A			
1	Define positive closure of an alphabet.	10	1	L1
2	Define sentential form.		1	L1
3	Find the language accepted by following grammar:- $S \rightarrow 0S1/0A1$, $A \rightarrow 1A/1$		1	L2
4	Construct regular grammar for the following language:- $L = \{a^l b^m \mid l, m \geq 2\}$		1	L2
5	Define context sensitive grammar.		1	L1
6	Write the properties of extended transition function $\delta\hat{}$ of NFA.		2	L1
7	Define NFA.		2	L1
8	Find the language accepted by following DFA. 		2	L2
9	Construct the DFA for the following language:- $L = \{a^m b^n \mid m, n \geq 3\}$		2	L3
10	Find the regular expression of the following set:- $L = \{a^m b^n \mid m, n \geq 2 \text{ and } mn \geq 7\}$		2	L3
	Section-B			
Attempt any two.				
1	Construct grammar for the following languages:- (a) $L(G) = \{ w \in \{a, b\}^* \mid n_a(w) \neq n_b(w)\}$ (b) All strings of a and b with at least three a's.	5	1	L3
2	Construct grammar for the following languages:- (a) $L = \{0^m 1^n \mid 2 \leq m \leq n\}$ (b) $L = \{a^n b^n c^n \mid n \geq 2\}$	5	1	L3
3	Find the language accepted by the following grammars:- (a) $S \rightarrow 1S/0A/0/1$, $A \rightarrow 1A/1S/1$ (b) $S \rightarrow 0S1/0A/0/1B/1$, $A \rightarrow 0A/0$, $B \rightarrow 1B/1$	5	1	L3

Section-C

Attempt any one.

1.	(a) Construct DFA for the following language:- L = All the strings of 0 and 1 with exactly three 0's and more than two 1's. (b) Minimize the following DFA:-  	10	2	L4, L3
2.	(a) Construct DFA for the following language:- L = The set of all the strings of a and b that contains at least two consecutive a's and not contain consecutive b's. (b) Eliminate ε-transitions from the following NFA:-  	10	2	L4, L4

Bloom's Taxonomy Level:

1- Remembering, 2. Understanding, 3.Applying, 4.Analyzing, 5.Evaluating, 6. Creating

CO -Course Outcome