Roll No	2	2	9	4	0	3	8

End Semester Examination 2024

Name of Course: B.Tech
Name of Paper: Finite Automata and Formal Languages
Time: 3 Hour's

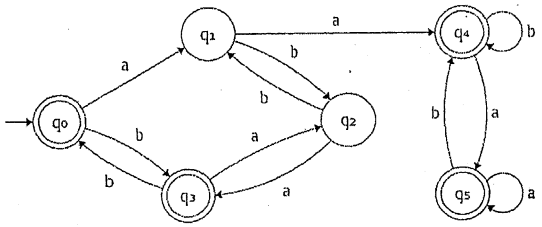
Semester: IV
Paper Code: TCS 402
Maximum Marks: 100

Note:

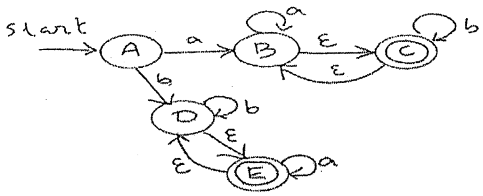
i. All questions are compulsory.
ii. Answer any two sub questions among a, b and c in each main question.
iii. Total marks in each main question are twenty.
iv. Each question carries 10 marks.

Q1 (10 X 2=20 Marks)

a. Minimize the given DFA shown below.



b. Convert the following NFA with epsilon moves to DFA:



C. Construct DFA equivalent to the NFA {{P,Q,R,S},{0,1},£,P,{P,Q}}, where the transition function given by the following table:

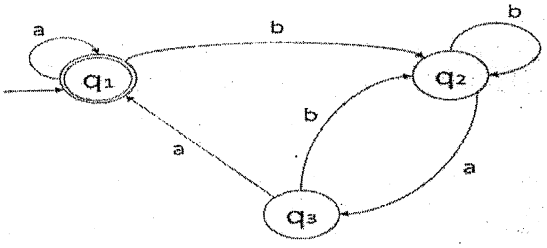
States	0	1
P	Q,S	Q
Q	R	Q,S
R	S	S
S	Q	P

Q2 (10 X 2=20 Marks)

a. Prove that the following language $L= \{a^n b^n : n>=0\}$ is not a regular language.

b. Draw a Moore or Mealy machine that generates output 'YES' when accepts a set of strings from (0+1)* terminating in last two same symbols.

c. State and prove Arden's theorem. Also write Regular Expression for the given DFA.



Q3		(10 X 2=20 Marks)
a	Convert the following grammar to Chomsky Normal Form (CNF) and in Greibach normal form (GNF) S→ aSa|bSb|a|b|aa|bb	
b.	Check whether the grammar is ambiguous or not. R→R+R/RR/R*/a/b/c. Obtain the string w=a+b*c	
c.	Construct 2stack PDA for the language $L = \{a^n b^n c^n d^n, n>=1\}$	
Q4		(10 X 2=20 Marks)
a.	Briefly explain the instantaneous Description of PDA. Convert the grammar S-> aAA, A->a|aS|bS to a PDA that accepts the same language by empty stack.	
b.	Consider the production shown below – S→aSbS | bSaS | ε Convert the give ambiguous grammar into unambiguous grammar	
c.	Explain in detail about the Turing Church's Thesis and Recursively Enumerable Languages.	
Q5		(10 X 2=20 Marks)
a.	Construct Turing Machine for the language $L = \{a^n b^n c^n, n>=1\}$	
b.	Write short notes on following. • Turing Machine as Computer of Integer Functions • Universal Turing Machine	
c.	Explain in detail about .... • Halting Problem and Post-Correspondence problem. • Recursive and recursively enumerable languages in detail	