$U \rightarrow cU|\Lambda$

$V \rightarrow aVc|W$

$W \rightarrow bW|\Lambda$.

(b) Convert the following grammar into CNF : **7**

$S \rightarrow bA/aB$

$A \rightarrow bAA/aS/a$

$B \rightarrow aBB/bS/a$.

Unit III

5. (a) Construct PDA from the following Grammar : **7**

$S \rightarrow aB$

$B \rightarrow bA/b$

$A \rightarrow aB$

(b) Construct an equivalent PDA for the following CFG : **8**

$S \rightarrow aAB|bBA$

$A \rightarrow bS|a$

$B \rightarrow aS|b$.

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B.Tech. EXAMINATION, 2022

(Fifth Semester)

(C-Scheme) (Main & Re-appear)

(CSE)

CSE307C

FORMAL LANGUAGES AND AUTOMATA THEORY

Time : 3 *Hours*] [*Maximum Marks :* 75

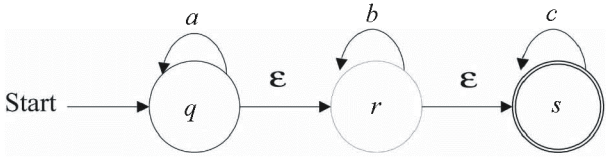
Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Define NFA. What are the differences between DFA and NFA ? **5**

(b) Convert the following NFA with ε moves to DFA without ε moves. **5**



(c) State Arden's theorem and construct the regular expression for the following FA using Arden's theorem. **5**

2. (a) List out the identities of Regular expression. **5**

(b) Construct an equivalent FA for the given regulation expression :

$(0 + 1)^*(00 + 11)\ (0 + 1)^*$. **5**

(c) Convert the following Mealy machine into its equivalent Moore machine. **5**

Present State	I/P = 0		I/P = 1	
	Next State	O/P	Next State	O/P
→ A	C	0	B	0
B	A	1	D	0
C	B	1	A	1
D	D	1	C	0

Unit II

3. (a) Prove that language L = $\{a^n b^n \mid n >= 1\}$ is not regular pumping lemma with procedure. **7**

(b) Write the procedure and eliminate left recursion from the following Grammar : **8**

E → E + T/T

T → T*F/F

F → (E)/id

4. (a) Simplify the following context free grammar. (Here, Λ stands for epsilon (ε)) : **8**

S → TU|V

T → aTb|Λ

6. (a) Explain the various types of Turing machine. **7**

(b) Explain conversion of regular expression to TM with example. **8**

Unit IV

7. (a) Explain Chomsky hierarchy of languages in detail. **7**

(b) Describe context sensitive languages in detail. **8**

8. Write short notes on the following : **15**

(a) Primitive recursive function

(b) Myhill-Nerode theorem.

6. (a) Explain the various types of Turing machine. 7

(b) Explain conversion of regular expression to TM with example. 8

Unit IV

7. (a) Explain Chomsky hierarchy of languages in detail. 7

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8. Write short notes on the following : 15

(a) Primitive recursive function

(b) Myhill-Nerode theorem.