

(i) Printed Pages: 3

Roll No.

(ii) Questions : 9

Sub. Code :

3	6	1	9
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Exam. Code :

0	4	6	1
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M.Sc. Information Technology 3rd Semester

1128

THEORY OF COMPUTATION

Paper : MS-69

Time Allowed : Three Hours]

[Maximum Marks : 80

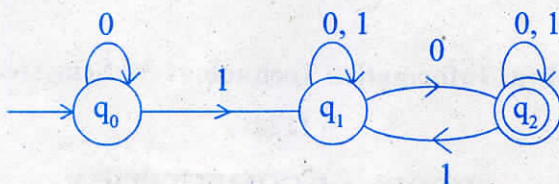
Note :— Attempt **five** questions in all. Question No. 9 (Section-E) is compulsory and selecting **one** question each from Sections-A to D.

SECTION—A

1. (i) Write short notes on DFA and NFA. 8
- (ii) Define a DFA that read strings made up of letters in the word CHARIOT and recognize those strings that contain the word CAT as a substring. 8
2. (i) Write short note on Chomsky hierarchy of languages. 8
- (ii) Discuss Moore machine and conversion from Moore machine to Mealy machine using suitable examples. 8

SECTION—B

3. (i) Convert the automata given in diagram below from NFA to DFA. 8



- (ii) Prove that $L = \{a^n b^n, n \geq 1\}$ is regular language or not. 8
4. (i) Write regular expressions for the following language on $\{0, 1\}$.
- (a) All strings ending in 01
 - (b) All strings not ending in 01. 8
- (ii) Write short note on construction of FA equivalent to regular expression using suitable example. 8

SECTION—C

5. (i) Discuss CYK algorithm using suitable example. 8
- (ii) Convert the grammar with following productions to Chomsky normal form :
- $$S \rightarrow ABa, A \rightarrow aab, B \rightarrow Ac. \quad 8$$
6. (i) Construct a pda or npda that accepts the language generated by grammar with productions : $S \rightarrow aSbb \mid aab$. 8
- (ii) Discuss procedure of conversion to Greibach normal form using suitable example. 8

SECTION—D

7. (i) Discuss turing machine in detail. 8
(ii) What is halting problem ? Is it decidable or undecidable ? 8
8. (i) Construct a Turing machine for $L = \{0^n 1^n \mid n \geq 1\}$. 8
(ii) Write short note on post correspondence problem. 8

SECTION—E

(Compulsory Question)

9. (i) Differentiate between NFA- ϵ and NFA.
(ii) Prove : if L_1 and L_2 are two regular languages, then $L_1 \cup L_2$ is regular.
(iii) Define Chomsky and Greibach Normal forms.
(iv) Discuss post correspondence problem. $4 \times 4 = 16$