

T.Y. B. SC. (Computer Science) SEM –V (CBCS - 2016 COURSE) :
WINTER - 2018

SUBJECT: THEORETICAL COMPUTER SCIENCE

Day : Monday
Date : 15/10/2018

W-2018-0931

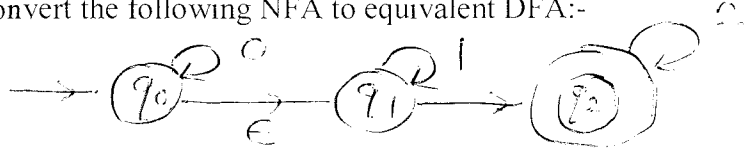
Time: 03.00 PM TO 06.00 PM
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

Q.1 Answer **ANY TWO** (12)

- a) Define Moore and Melay machine. Design Moore and Melay machine for binary input sequence which outputs 'A' if 101 is recognized otherwise output is 'B'.
- b) Convert the following NFA to equivalent DFA:-



- c) Differentiate between NFA and DFA.

Q.2 Answer **ANY TWO** (12)

- a) What is ambiguous grammar? Check whether the given grammar is ambiguous?
 $S \rightarrow AB \mid aaB$, $A \rightarrow a \mid Aa$, $B \rightarrow b$
- b) Explain Chomsky Hierarchy in detail.
- c) Write steps to minimize DFA using Myhill Nerode Theorem. Explain with example.

Q.3 Answer **ANY TWO** (12)

- a) Draw DFA for the language accepting the string where 'b' is preceded by 'a' over input alphabet $\Sigma = \{a, b\}$.
- b) Construct NFA for the language accepting the substring 'aa' but not 'bb' over input alphabet $\Sigma = \{a, b\}$.
- c) Write a note on push down automata.

Q.4 Answer **ANY THREE** (12)

- a) Define Null String, Relation, Transitive Closure, Symbol.
- b) Explain how to convert CFG to GNF?
- c) Construct FA for regular expression $(a+bb)^*ba$.
- d) Give formal definition of TM.

Q.5 Answer **ANY FOUR** (12)

- a) Explain pumping lemma with an example.
- b) Differentiate between left derivation and right derivation tree.
- c) Design a DFA which accepts odd number of '1' s and even number of '0' s over $\{0,1\}$.
- d) Differentiate between Moore machine and Melay Machine.
- e) Convert the following grammar into CNF.
 $S \rightarrow aSa \mid bSb \mid a \mid b$

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