

M. Sc. (Final)
Term End Examination, 2016-17

COMPUTER SCIENCE

Paper - I

Theory of Computation & Compiler Design

Time : Three Hours] [Maximum Marks : 100
[Minimum Pass Marks : 36

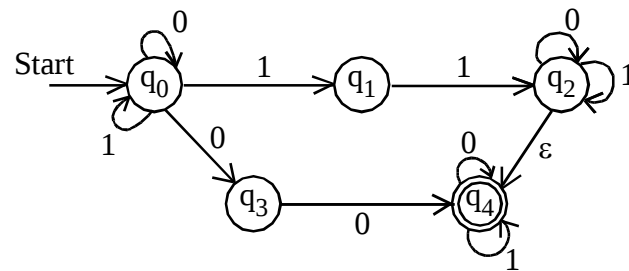
Note : Answer any **five** questions. All questions carry equal marks.

1. (a) Explain the principle of Mathematical Induction with example.
- (b) Prove the following theorem by Induction Method :

$$1+2+3+\dots+n = n(n+1)/2$$

(2)

2. Construct a DFA equivalent to the NFA given in the following figure :



3. Explain the following with example :
- Finite Automata with ϵ -moves
 - Mealy Machine
 - Regular Expressions
4. Construct Finite Automata for the Regular expression :

$$10 + (0 + 11)0^*1$$

5. What is PDA? Explain the equivalence of PDA & CFG.

PDA $\rightarrow$ Push Down Automata

CFG $\rightarrow$ Context Free Grammar

6. Let G be the Grammar :

$$S \rightarrow aB / bA$$

$$A \rightarrow a / aS / bAA$$

$$B \rightarrow b / bS / aBB$$

(3)

For the string aaabbabba find :

- (a) Left most derivation
- (b) Right most derivation
- (c) Parse Tree

7. Explain the following :

- (a) Types of Parsing
- (b) Lexical Analysis
- (c) Peehole optimisation.

8. What is Code Generation & Optimization?
Explain main issue in the design of code
generation.
