



AF-3580

M.Sc. (Final)
Term End Examination, 2017-18

COMPUTER SCIENCE

Paper - I

Theory of Computation and
Compiler Design

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

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

1. (a) If $A = \{x, y\}$ and $B = \{y, z\}$, then find
 - (i) $A \cup B$
 - (ii) $A \cap B$
 - (iii) A^*
 - (iv) $(A \cup B)^*$

(2)

(b) Find R^* for the relations

$$R = \{(1, 1), (1, 2), (2, 1), (2, 3), (3, 2)\}.$$

2. (a) Explain Non-deterministic Automata (NDFA) with example.
(b) Construct a Deterministic Automaton equivalent to $M = \{(q_0, q_1), (0, 1), \delta, q_0, [q_0]\}$ δ is given by its state table :

State / Σ	0	1
$\rightarrow (q_0)$	q_0	q_1
q_1	q_1	q_0, q_1

3. (a) Explain Regular Expression.
(b) Explain pumping lemma for Regular Set.

4. Explain Context Free Grammar (CFG). Find CFG symbol equivalent to :

$$S \rightarrow AB / CA$$
$$A \rightarrow a$$
$$B \rightarrow BC / AB$$
$$C \rightarrow aB / b$$

5. What is Compiler ? Explain the phases of a compiler.

6. Explain the role of lexical analyzer and parser.

7. Describe the concept of peephole optimization.

(3)

8. Explain the following :

- (a) Pushdown Automata
- (b) Un-decidable Problem
- (c) DAG
