



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 (NFA) 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
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