

NOVEMBER/DECEMBER 2019

**MCS11 — FORMAL LANGUAGES AND  
AUTOMATA THEORY**

Time : Three hours

Maximum : 75 marks

**SECTION A — (5 × 6 = 30 marks)**

Answer ALL questions.

1. (a) Define set and power set. Give examples.  
Or  
(b) How do you calculate number of permutation and number of combinations?
2. (a) Define deterministic and non deterministic finite automata.  
Or  
(b) Define Moore machine.
3. (a) Find the languages for the grammars with productions  
(i)  $S \rightarrow aS, S \rightarrow a$   
(ii)  $S \rightarrow aSb, S \rightarrow ab$ .  
Or  
(b) Define parse tree. Give an example.

4. (a) Give the basic structure of PDA.  
Or  
(b) Discuss correspondence between PDA and CFL.
5. (a) Explain TM for multiplication briefly.  
Or  
(b) Discuss Instantaneous description of TM.

**SECTION B — (3 × 15 = 45 marks)**

Answer any THREE questions.

6. Discuss various types of relations with examples.
7. Explain mealy machine and construct NFA for  $(ab)^*$ .
8. (a) Explain rightmost derivation with an example.  
(b) Explain ambiguity of a grammar with an example.  
(c) Define Regular expression.
9. Discuss two types of Acceptance by PDA and 'parsing and PDA'.
10. Define Turing machine and discuss TM as computer for positive integer.

