

B.Tech II Year II Semester (R15) Regular Examinations May/June 2017
FORMAL LANGUAGES & AUTOMATA THEORY
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Define a DFA formally.
 - (b) Differentiate between a Moore machine and a mealy machine.
 - (c) What are various forms in which we can represent regular languages?
 - (d) Construct a DFA that accepts strings which does not contain a substring of 110.
 - (e) State and prove ARDEN's theorem.
 - (f) When do we say a CFG is in Greibach Normal Form?
 - (g) Compare and contrast DPDA and NPDA.
 - (h) State the properties of LR grammars.
 - (i) Write short notes on Linear Bounded Automata.
 - (j) List the closure properties of Recursively Enumerable Languages.

PART – B
 (Answer all five units, 5 X 10 = 50 Marks)

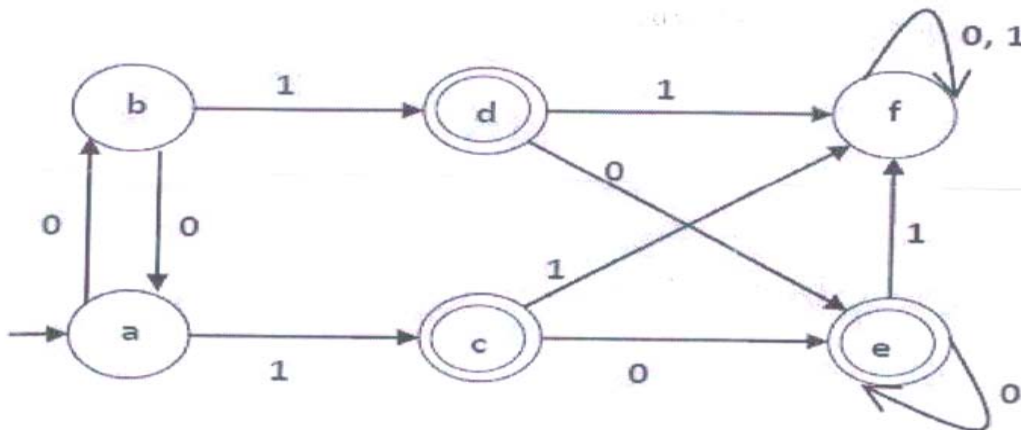
UNIT – I

- 2 Convert the following mealy machine into its equivalent Moore machine.

From state	i/p	To state	o/p	i/p	To state	o/p
Q ₀	0	Q ₁	N	1	Q ₃	N
Q ₁	0	Q ₂	N	1	Q ₃	N
Q ₂	0	Q ₂	Y	1	Q ₃	N
Q ₃	0	Q ₁	N	1	Q ₄	N
Q ₄	0	Q ₁	N	1	Q ₄	Y

OR

- 3 Minimize the following automata.



UNIT – II

- 4 Prove that the language $0^p \mid p \text{ is a prime number}$ is not regular.
- OR**
- 5 (a) Explain how equivalence between two FA is verified with an example.
 (b) What are the applications of regular expressions and finite automaton?

UNIT – III

6 Convert the following grammar into Greibach Normal form:
 $A_1 \rightarrow A_2A_3; A_2 \rightarrow A_3A_1 | b; A_3 \rightarrow A_1A_2 | a;$

OR

7 Explain the closure properties of Context Free languages.

UNIT – IV

8 Construct a PDA that recognizes balanced parentheses.

OR

9 Construct a PDA that recognizes strings of type $a^i b^j c^{i+j}$.

UNIT – V

10 Construct a Turing machine which carries out proper subtraction ($a-b=0$, if $a < b$).

OR

- 11 (a) Explain Chomsky Hierarchy of languages.
(b) Explain any four variations of Turing machines.
