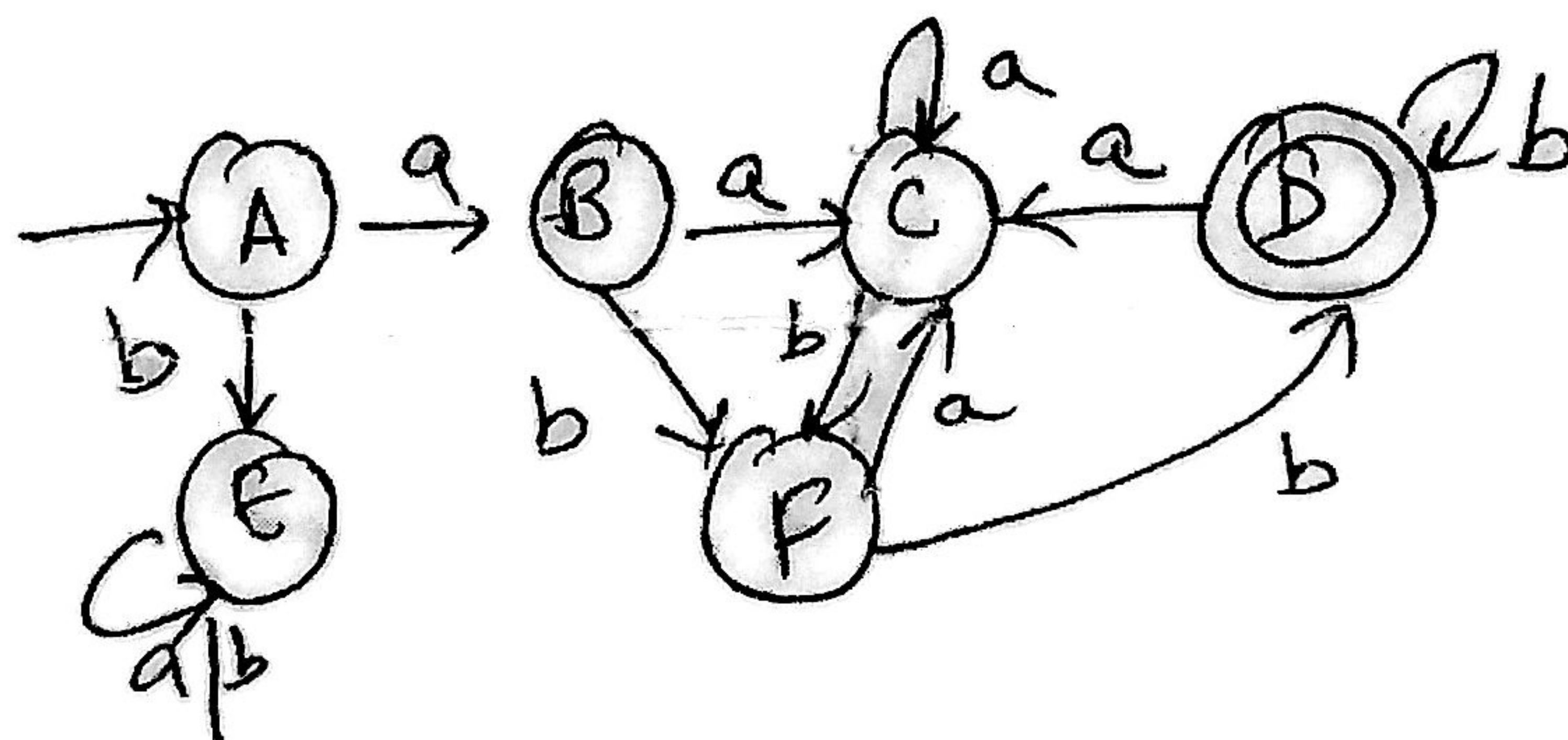


MCA - 304**M.C.A. III Semester Examination, December 2014****Theory of Computation****Time : Three Hours****Maximum Marks : 70**

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
- ii) All parts of each question are to be attempted at one place.
- iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
- iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

- ✓ 1. a) What is an automation?
- ✓ b) Differentiate between Kleene closure and transitive closure.
- ✓ c) Design finite automata for the given expression
 $0 + (0 + 1)^* + 1$
- d) Minimize the given automata:



OR

- ✓ Construct mealy machine equivalent to given moore machine

	Input		output
	0	1	
q_0	q_1	q_2	0
q_1	q_0	q_3	1
q_2	q_3	q_2	1
q_3	q_1	q_2	0

	Input		output
	0	1	
q_0	q_1	q_2	0
q_1	q_0	q_3	1
q_2	q_3	q_2	1
q_3	q_1	q_2	0

Unit - II

- ✓ 2. a) What is ambiguity in grammar?
- ✓ b) Define right most derivation and left most derivation.
- ✗ c) Design CFG to accept the language
 $L(G) = \{0^n / n \geq 1\}$

[2]

- ✓ d) Show that the given grammar is ambiguous.
 $S \rightarrow SbS/a$

OR

Find the reduced grammar equivalent to the given CFG:

$S \rightarrow aC, SB$

$A \rightarrow bSCa$

$B \rightarrow aSB/bBC$

$C \rightarrow aBC/ad$

Unit - III

3. a) Define PDA
 ✓ b) What is Greibach normal form.
 c) Explain the transitions mapping function of PDA.
 d) Design PDA to accept $\{ww^R/w \in (0, 1)^*\}$. Where w is a word and w^R is reverse of word.

OR

- ✓ Convert the given grammar to CNF?
 $S \rightarrow aAC, A \rightarrow aB/bAB, B \rightarrow b, C \rightarrow c$

Unit - IV

- ✓ 4. a) Why Turing machine is known as acceptor?
 ✓ b) What is multi-dimensions Turing machine.
 c) Design Turing machine for the language.

$$L = \{a^n b^m a^{n+m}; n \geq 1, m \geq 1\}$$

- d) Explain universal Turing machine.

OR

- ✓ Design Turing machine for the language:

$$L(G) = \{0^n 1^n / n \geq 1\}$$

Unit - V

- ✓ 5. a) What is undecidability?
 ✓ b) What is recursively enumerable sets?
 ✓ c) Explain complexity theory.
 ✓ d) Describe linear bounded automata and its applications.

OR

Explain context sensitive grammar and their equivalence.
