

Code.No: NR-RR310504

NR/RR

SET-1

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
THEORY OF COMPUTATION
(COMMON TO CSE, CSS, CSIT)

Time: 3hours

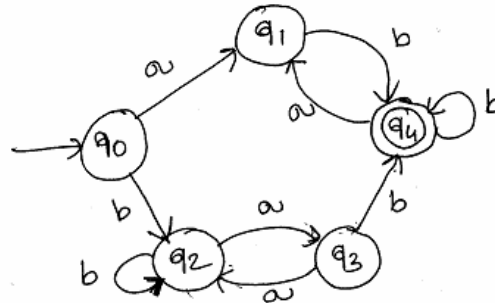
Max.Marks:80

Answer any FIVE questions
 All questions carry equal marks

- 1.a) Show that for every NFA there exists an equivalent DFA.
 b) Design DFA to accept strings of 0's and 1's such that strings end with 1110. [8+8]
- 2.a) Convert the Mealy machine into equivalent moore machine as shown in the table

Present state	Next State			
	a=0		a=1	
	State	Output	State	Output
q_0	q_0	0	q_1	1
q_1	q_2	1	q_0	0
q_2	q_1	2	q_2	2

- b) Minimize the following finite automata and show both given and reduced are equivalent. [8+8]



3. Construct NFA for the following regular expressions.
 a) $0 + 10^* + 01^*0$
 b) $(0 + 1)^* (01 + 110)$ [8+8]

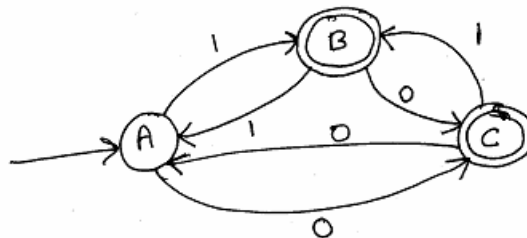
- 4.a) What is the language generated by the CFG.

$$S \rightarrow asb \mid aAb \mid aBb$$

$$A \rightarrow aA \mid a$$

$$B \rightarrow Bb \mid b$$

- b) Obtain a right linear and left – linear grammar for the following FA. [8+8]



5.a) Convert the following grammar to GNF.

$$A_1 \rightarrow A_2 A_3$$

$$A_2 \rightarrow A_3 A_1 \mid b$$

$$A_3 \rightarrow A_1, A_2 \mid a$$

b) Prove that $L = \{a^n b^n / n \geq 1\}$ is not context-free language. [8+8]

6.a) Design PDA accepting L by empty stack equivalent to the following CFG.

$$S \rightarrow oBB$$

$$B \rightarrow oS / IS / o$$

Test whether $0 \mid 0^4$ is accepted by the PDA

b) Construct a CFG which accepts $N(A)$ and simplify the same where [8+8]

$A = (\{q_0, q_1\}, \{a, b\}, \{Z_0, Z\}, \delta, q_0, Z_0, \phi)$ where δ is given by

$$\delta(q_0, b, Z_0) = \{q_0, ZZ_0\}$$

$$\delta(q_0, \epsilon, Z_0) = \{q_0, \epsilon\}$$

$$\delta(q_0, b, z) = \{q_0, ZZ\}$$

$$\delta(q_0, a, Z) = \{q_1, Z\}$$

$$\delta(q_1, b, z) = \{q_1, \epsilon\}$$

$$\delta(q_1, a, Z_0) = \{q_0, Z_0\}$$

7.a) Design a Turing Machine for the following language.

$$L = \{ww^R \mid W \in (a \mid b)^*\}$$

b) Discuss the types of Turing machines. [8+8]

8.a) Explain the Chomsky Hierarchy of languages

b) What is the post correspondence problem? Is there any solution for the following PCP problem? If so give the solutions if not discuss why. [8+8]

	LIST A	LIST B
i	w_i	x_i
1	00	0
2	001	11
3	1000	011

--ooOoo--

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
THEORY OF COMPUTATION
(COMMON TO CSE, CSS, CSIT)

Time: 3hours

Max.Marks:80

Answer any FIVE questions
All questions carry equal marks

1. Construct NFA for the following regular expressions.

c) $0 + 10^* + 01^*0$

d) $(0 + 1)^* (01 + 110)$

[8+8]

- 2.a) What is the language generated by the CFG.

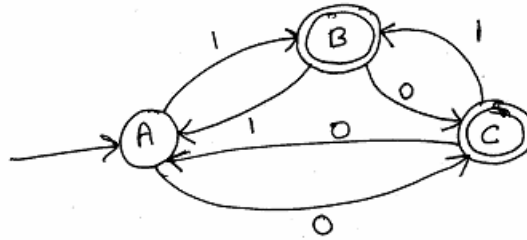
$$S \rightarrow asb \mid aAb \mid aBb$$

$$A \rightarrow aA \mid a$$

$$B \rightarrow Bb \mid b$$

- b) Obtain a right linear and left – linear grammar for the following FA.

[8+8]



- 3.a) Convert the following grammar to GNF.

$$A_1 \rightarrow A_2 A_3$$

$$A_2 \rightarrow A_3 A_1 \mid b$$

$$A_3 \rightarrow A_1 A_2 \mid a$$

- b) Prove that $L = \{a^n b^n / n \geq 1\}$ not context – free language.

[8+8]

- 4.a) Design PDA accepting L by empty stack equivalent to the following CFG.

$$S \rightarrow oBB$$

$$B \rightarrow oS \mid IS \mid o$$

Test whether $0 \mid 0^4$ is accepted by the PDA

- b) Construct a CFG which accepts N (A) and simplify the same where

[8+8]

$A = (\{q_0, q_1\}, \{a, b\}, \{Z_0, Z\}, \delta, q_0, Z_0, \phi)$ where δ is given by

$$\delta(\{q_0, b, Z_0\} = \{q_0, ZZ_0\}$$

$$\delta(q_0, \epsilon, Z_0) = \{q_0, \epsilon\}$$

$$\delta(q_0, b, z) = \{q_0, ZZ\}$$

$$\delta(q_0, a, Z) = \{q_1, Z\}$$

$$\delta(q_1, b, z) = \{q_1, \epsilon\}$$

$$\delta(q_1, a, Z_0) = \{q_0, Z_0\}$$

5.a) Design a Turing Machine for the following language.

$$L = \{ww^R \mid w \in (a|b)^*\}$$

b) Discuss the types of Turing machines.

[8+8]

6.a) Explain the Chomsky Hierarchy of languages

b) What is the post correspondence problem? Is there any solution for the following PCP problem? If so, give the solutions; if not, discuss why.

[8+8]

	LIST A	LIST B
i	w_i	x_i
1	00	0
2	001	11
3	1000	011

7.a) Show that for every NFA there exists an equivalent DFA.

b) Design DFA to accept strings of 0's and 1's such that strings end with 1110.

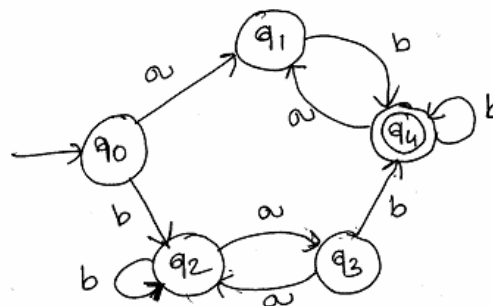
[8+8]

8.a) Convert the Mealy machine into an equivalent Moore machine as shown in the table

Present state	Next State			
	a=0		a=1	
	State	Output	State	Output
q_0	q_0	0	q_1	1
q_1	q_2	1	q_0	0
q_2	q_1	2	q_2	2

b) Minimize the following finite automata and show both given and reduced are equivalent.

[8+8]



--ooOoo--

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
THEORY OF COMPUTATION
(COMMON TO CSE, CSS, CSIT)

Time: 3hours

Max.Marks:80

Answer any FIVE questions
All questions carry equal marks

- 1.a) Convert the following grammar to GNF.
 $A_1 \rightarrow A_2 A_3$
 $A_2 \rightarrow A_3 A_1 | b$
 $A_3 \rightarrow A_1, A_2 | a$
- b) Prove that $L = \{a^n b^n / n \geq 1\}$ is not context-free language. [8+8]
- 2.a) Design PDA accepting L by empty stack equivalent to the following CFG.
 $S \rightarrow oBB$
 $B \rightarrow oS / IS / o$
 Test whether $0|0^4$ is accepted by the PDA
- b) Construct a CFG which accepts N(A) and simplify the same where [8+8]
- $A = (\{q_0, q_1\}, \{a, b\}, \{Z_0, Z\}, \delta, q_0, Z_0, \phi)$ where δ is given by
 $\delta(\{q_0, b, Z_0\}) = \{q_0, ZZ_0\}$
 $\delta(q_0, \epsilon, Z_0) = \{q_0, \epsilon\}$
 $\delta(q_0, b, z) = \{q_0, ZZ\}$
 $\delta(q_0, a, Z) = \{q_1, Z\}$
 $\delta(q_1, b, z) = \{q_1, \epsilon\}$
 $\delta(q_1, a, Z_0) = \{q_0, Z_0\}$
- 3.a) Design a Turing Machine for the following language.
 $L = \{ww^R \mid W \in (a|b)^*\}$
- b) Discuss the types of Turing machines. [8+8]
- 4.a) Explain the Chomsky Hierarchy of languages
- b) What is the post correspondence problem? Is there any solution for the following PCP problem? If so give the solutions if not discuss why. [8+8]

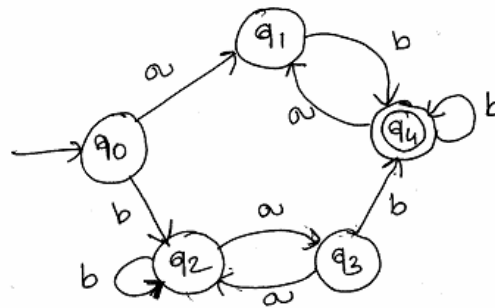
	LIST A	LIST B
i	w_i	x_i
1	00	0
2	001	11
3	1000	011

- 5.a) Show that for every NFA there exists an equivalent DFA.
- b) Design DFA to accept strings of 0's and 1's such that strings end with 1110. [8+8]

- 6.a) Convert the Mealy machine into equivalent moore machine as shown in the table

Present state	Next State			
	a=0		a=1	
	State	Output	State	Output
q_0	q_0	0	q_1	1
q_1	q_2	1	q_0	0
q_2	q_1	2	q_2	2

- b) Minimize the following finite automata and show both given and reduced are equivalent. [8+8]



7. Construct NFA for the following regular expressions.

e) $0 + 10^* + 01^*0$

f) $(0 + 1)^* (01 + 110)$

[8+8]

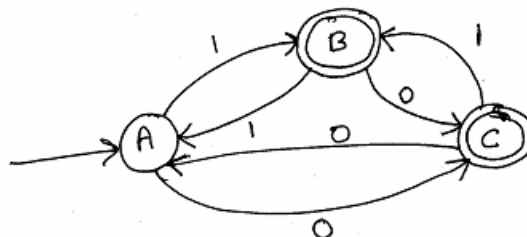
- 8.a) What is the language generated by the CFG.

$$S \rightarrow asb \mid aAb \mid aBb$$

$$A \rightarrow aA \mid a$$

$$B \rightarrow Bb \mid b$$

- b) Obtain a right linear and left – linear grammer for the following FA. [8+8]



--ooOoo--

Code.No: NR-RR310504

NR/RR

SET-4

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
THEORY OF COMPUTATION
(COMMON TO CSE, CSS, CSIT)

Time: 3hours

Max.Marks:80

Answer any FIVE questions
All questions carry equal marks

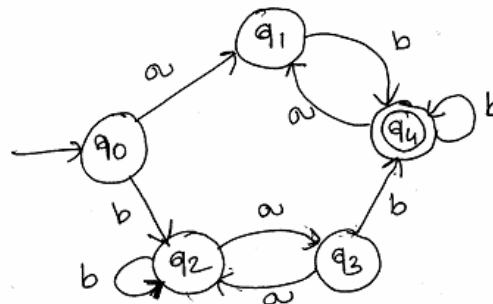
- 1.a) Design a turing Machine for the following language.
 $L = \{ww^R \mid W \in (a|b)^*\}$
- b) Discuss the types of tuning machines. [8+8]
- 2.a) Explain the Chomsky Hierarchy of languages
- b) What is post correspondence problem? Is there any solution for the following PCP problem? If so give the solutions if not discuss why. [8+8]

	LIST A	LIST B
i	w_i	x_i
1	00	0
2	001	11
3	1000	011

- 3.a) Show that for every NFA there exists an equivalent DFA.
- b) Design DFA to accept strings of 0's and 1's such that strings end with 1110. [8+8]
- 4.a) Convert the Mealy machine into equivalent moore machine as shown in the table

Present state	Next State			
	a=0		a=1	
	State	Output	State	Output
q_0	q_0	0	q_1	1
q_1	q_2	1	q_0	0
q_2	q_1	2	q_2	2

- b) Minimize the following finite automata and show both given and reduced are equivalent. [8+8]



5. Construct NFA for the following regular expressions.

g) $0 + 10^* + 01^*0$

h) $(0 + 1)^* (01 + 110)$

[8+8]

6.a) What is the language generated by the CFG.

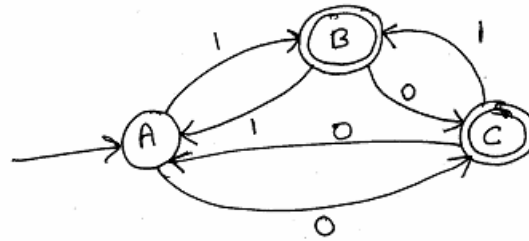
$$S \rightarrow asb \mid aAb \mid aBb$$

$$A \rightarrow aA \mid a$$

$$B \rightarrow Bb \mid b$$

b) Obtain a right linear and left – linear grammar for the following FA.

[8+8]



7.a) Convert the following grammar to GNF.

$$A_1 \rightarrow A_2 A_3$$

$$A_2 \rightarrow A_3 A_1 \mid b$$

$$A_3 \rightarrow A_1, A_2 \mid a$$

b) Prove that $L = \{a^n b^n \mid n \geq 1\}$ not context – free language.

[8+8]

8.a) Design PDA accepting L by empty stack equivalent to the following CFG.

$$S \rightarrow oBB$$

$$B \rightarrow oS \mid IS \mid o$$

Test whether $0 \mid 0^4$ is accepted by the PDA

b) Construct a CFG which accepts N (A) and simplify the same where

[8+8]

$A = (\{q_0, q_1\}, \{a, b\}, \{Z_0, Z\}, \delta, q_0, Z_0, \phi)$ where δ is given by

$$\delta(q_0, b, Z_0) = \{q_0, ZZ_0\}$$

$$\delta(q_0, \epsilon, Z_0) = \{q_0, \epsilon\}$$

$$\delta(q_0, b, z) = \{q_0, ZZ\}$$

$$\delta(q_0, a, Z) = \{q_1, Z\}$$

$$\delta(q_1, b, z) = \{q_1, \epsilon\}$$

$$\delta(q_1, a, Z_0) = \{q_0, Z_0\}$$

--ooOoo--