Final Exam

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1.

given grammar

$A \rightarrow Aa \mid B$

$B \rightarrow Bb \mid \varepsilon$

Solution :- This grammar will accept strings over { epsilon, a, b, ba, --- } But not "ab".

$b^* a^*$

2. $(a|bb)^* (a|b)^+ c|\varepsilon)$

Sol :-

$S \rightarrow ABC$

$C \rightarrow c \mid \varepsilon$

$A \rightarrow DA \mid \varepsilon$

$B \rightarrow EB \mid E$

$D \rightarrow a \mid bb$

$E \rightarrow a \mid b$

3. term -> term mulop factor | factor

Sol :-

$A \rightarrow A\alpha \mid \beta$

$A \rightarrow \beta A'$

$A' \rightarrow \alpha A' \mid \varepsilon$

-> Rules

term -> factor term'

term' -> mulop factor term' | ε

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4-)

exp -> lexp term list | lexp lexp-seq list

Sol :-

$A \to \alpha\beta \mid \alpha\delta$

$A \to \alpha A'$

$A' \to \beta \mid \delta$

exp -> lexp exp'

exp' -> term list | lexp-seq list

5)

Given CF grammar S -> SSa | a.

1) String "aaaaa".

Sol :-

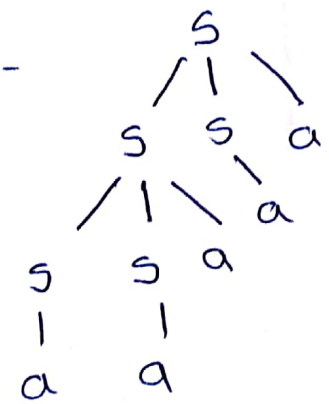
S => SSa (S->SSa)
=> SSaSa (S->a)
=> aSaSa (S->a)
=> aaaSa (S->a)
=> aaaaa. (accept)

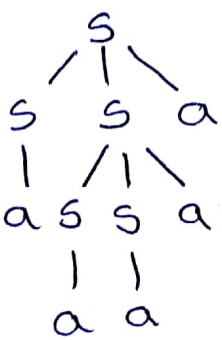
S => SSa (S->a)
=> aSa (S->SSa)
=> aSSaa (S->a)
=> aaSaa (S->a)
=> aaaaa (accept)

Two left-most derivatives "ambiguos".

2.

Sol :-





-> Two possibilities Grammar is ambiguos.

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6) "LL(1) Parsing"

String (()).

Rules

(→ "S → (S)S" | $ → "S → ε"

) → "S → ε"

	Parsing stack	Input	Action
1.	$ S	(()) $	S → (S) S
2.	$ S) S (	(()) $	Match
3.	$ S) S	()) $	S → (S) S
4.	$ S) S) S (	()) $	Match
5.	$ S) S) S	)) $	S → ε
6.	$ S) S)	)) $	Match
7.	$ S) S	) $	S → ε
8.	$ S)	) $	Match
9.	$ S	$	S → ε
10.	$	$	Accept

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7)

Given grammar

$A \rightarrow Aa|Ba|b$

$B \rightarrow Bc|Ac|d$

Step :1 :- Applying rules to A

$A \rightarrow BaA'|bA'$

$A' \rightarrow aA'|\varepsilon$

$A \rightarrow A\alpha|\beta$
$A \rightarrow \beta A'$
$A' \rightarrow \alpha A'|\varepsilon$

↓ Rules.

Substitue 'A' values in B.

$B \rightarrow Bc|BaA'c|bA'c|d$

Applying rules to 'B'.

$B \rightarrow bA'cB'|dB'$

$B' \rightarrow cB'|aA'cB'|\varepsilon.$

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8)

$S \rightarrow (A) \mid \varepsilon$

$A \rightarrow SA \mid S.$

1. Solution :-

Augumented grammar:

$S' \rightarrow S$

$S \rightarrow (A) \mid \varepsilon$

$A \rightarrow SA \mid S$

LR(0) items:-

$S' \rightarrow .S$ $S' \rightarrow S.$	$S \rightarrow .(A)$ $S \rightarrow (.A)$ $S \rightarrow (A.)$ $S \rightarrow (A).$	$S \rightarrow .$

$A \rightarrow .SA$ $A \rightarrow S.A$ $A \rightarrow SA.$	$A \rightarrow .S$ $A \rightarrow S.$

There are 12 LR[0] items.

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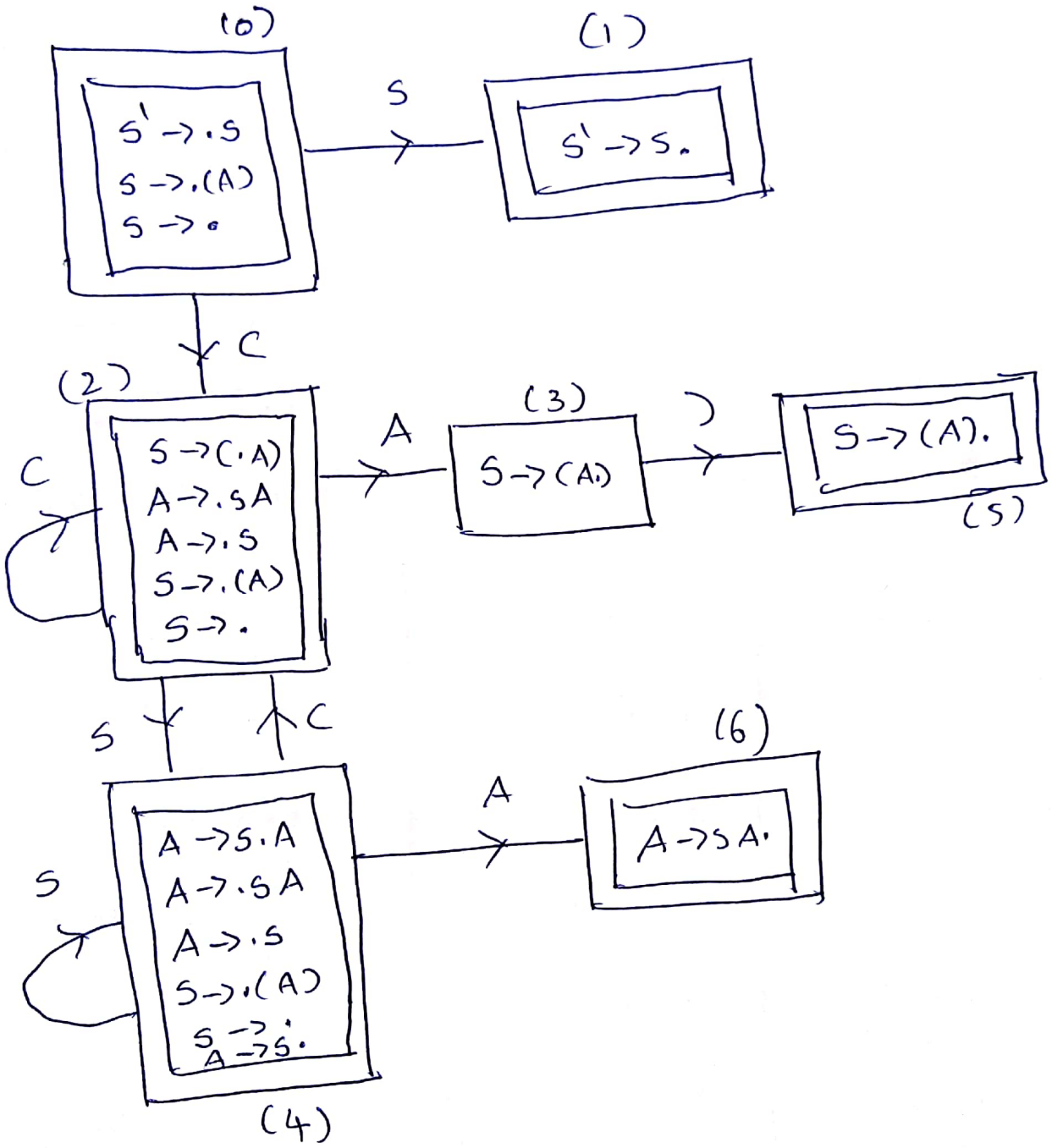
8)

3 Solution :-



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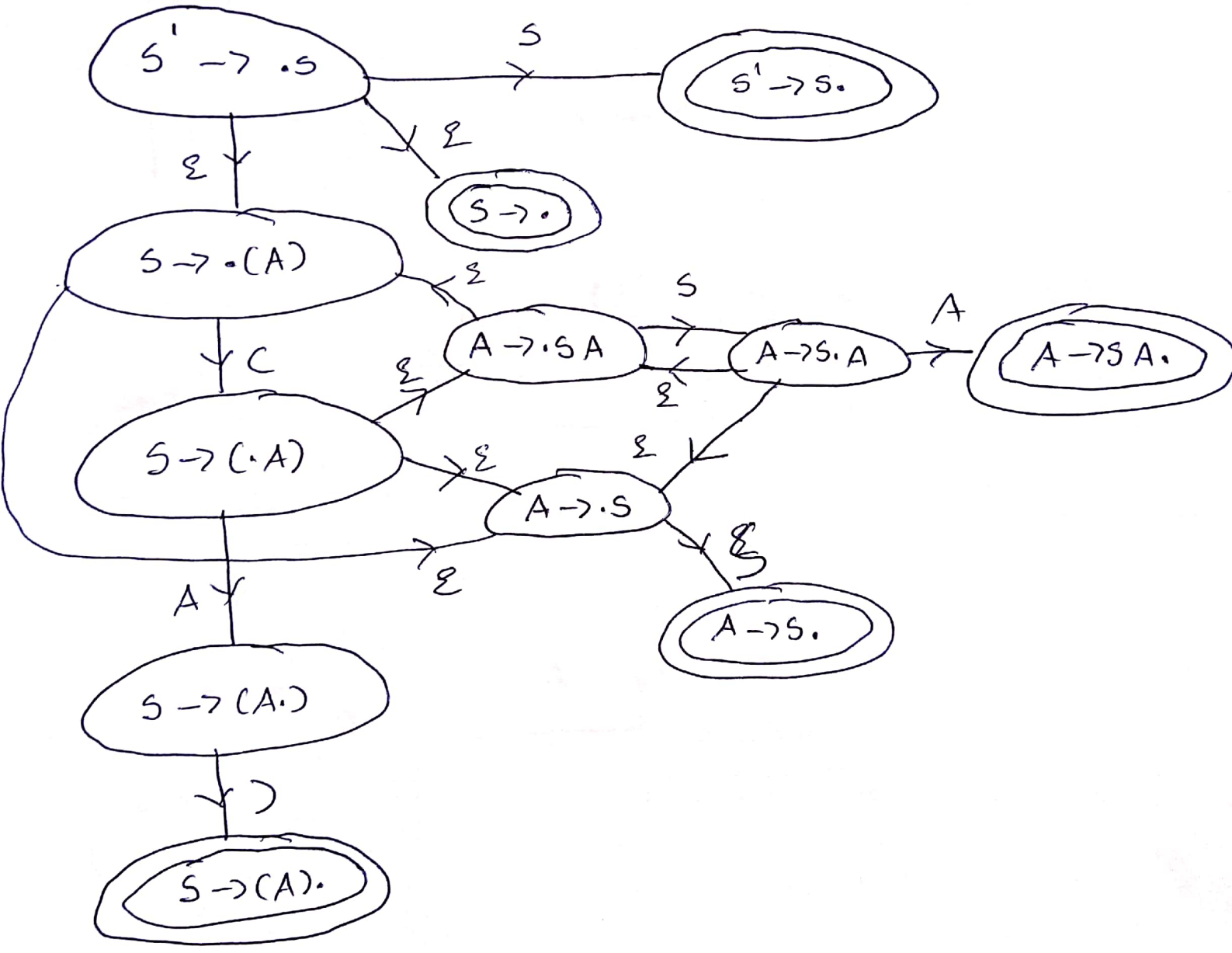
8)

2) solution NFA



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9)

	Parsing stack	Input	Action
1.	$ 0	(()()) $	shift
2.	$0(2	()()) $	shift
3.	$0(2(2	))()) $	Reduce S->ε
4.	$0(2(2S3	))()) $	Reduce S->ε
5.	$0(2(2S3S4	))()) $	shift
6.	$0(2(2S3S4)5	()()) $	Reduce S->(SS)
7.	$0(2S3	()()) $	shift
8.	$0(2S3(2	))()) $	Reduce S->ε
9.	$0(2S3(2S3	))()) $	Reduce S->ε
10.	$0(2S3(2S3S4	))()) $	shift
11.	$0(2S3(2S3S4)5	()) $	Reduce S->(SS)
12.	$0(2S3S4	()) $	shift
13	$0(2S3S4(	)) $	not accepted

"Parsing is not accepted".

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