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17. Match the following:
P: Semantic analyzer
Q: Parser
R: Code optimizer
S: Target code generation

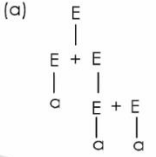
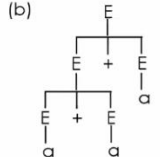
1. back end
2. Postfix notation
3. Eliminating redundant code
4. static type checking
5. syntax errors
6. correlating error messages

(a) P - 1, Q - 5, R - 3, S - 4
(b) P - 4, Q - 5, R - 3, S - 1
(c) P - 1, Q - 3, R - 6, S - 2
(d) P - 5, Q - 2, R - 3, S - 6

Key for Practice Questions

3. Parsing Techniques

01. Let + be a left associative operator then the syntax tree for a + a + a is in the grammar $E \rightarrow E + E/a$

(a)  (b) 

(c) Either (a) or (b) (d) Neither (a) nor (b)

02. Consider the grammar given below
 $S \rightarrow SS | a | \epsilon$
The sentence "aaa" has
(a) A unique derivation tree in the grammar

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13. (b) 14. (d) 15. (c) 16. **18** 17. (b)

03. A grammar that is both left and right recursive for a non-terminal is
(a) Ambiguous
(b) Unambiguous
(c) Information is not sufficient
(d) None

04. A grammar has the following productions:
 $S \rightarrow aSb/bbSa$
Which of the following sentences are in the language that is generated by this grammar

~~aaabbb~~ ~~bbbaaa~~ ~~ababab~~ ~~bababa~~

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05. Consider the following grammar
 $E \rightarrow E + E / (E * E) / id$
 The number of parse trees are possible for an input string $w = id + id + id$ is 2.

06. How many parse trees exists for an input string $w = abab$ in the CFG
 $S \rightarrow aSbS / bSaS / \epsilon$
 (a) 4 (b) 3 (c) 2 (d) 5

07. Consider the left recursive grammar
 $A \rightarrow Sa/b$
 $S \rightarrow Sc/Ad$
 Which of the following grammar is equivalent grammar with left recursion eliminated?
 (a) $A \rightarrow Sa/b$ (b) $A \rightarrow Sa/b$
 $S \rightarrow bdS^1$ $S \rightarrow bdS^1$
 $S \rightarrow cS^1/adS^1/\epsilon$ S^1cS^1/adS^1

09. What is the precedence and associativity of operators in
 $E \rightarrow E \uparrow T \mid T$
 $T \rightarrow F + T \mid F$
 $F \rightarrow i$
 (a) \uparrow has high precedence than +
 \uparrow is right associative
 + is left associative
 (b) \uparrow has high precedence than +
 \uparrow left associative
 + right associative
 (c) \uparrow has less precedence than +
 \uparrow is right associative
 + is left associative
 (d) \uparrow has less precedence than +
 \uparrow is left associative

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09. What is the precedence and associativity of operators in
 $E \rightarrow E \uparrow T \mid T$
 $T \rightarrow F + T \mid F$
 $F \rightarrow i$
 $i > + > \uparrow$
 right left
 (a) \uparrow has high precedence than +
 \uparrow is right associative
 + is left associative
 (b) \uparrow has high precedence than +
 \uparrow left associative
 + right associative
 (c) \uparrow has less precedence than +
 \uparrow is right associative
 + is left associative
 (d) \uparrow has less precedence than +
 \uparrow is left associative

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(a) $A \rightarrow Sa/b$
 $S \rightarrow bdS^1$
 $S \rightarrow cS^1/adS^1/\epsilon$

(b) $A \rightarrow Sa/b$
 $S \rightarrow bdS^1$
 $S^1 \rightarrow cS^1/adS^1$

(c) $S \rightarrow bdS'$
 $S^1 \rightarrow cS^1/adS^1/\epsilon$
 $A \rightarrow ScaA^1/bA^1$
 $A^1 \rightarrow daA^1/\epsilon$

(d) None

08. Consider the following expression grammar
 G:
 $E \rightarrow E - T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$

Which of the following grammars is not left recursive, but is equivalent to G?

(a) $E \rightarrow E - T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$

(b) $E \rightarrow TE'$
 $E' \rightarrow TE' \mid \epsilon$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$

(c) $E \rightarrow TX$
 $X \rightarrow TX \mid \epsilon$

(d) $E \rightarrow TX \mid (TX)$
 $X \rightarrow TX + TX \mid \epsilon$

10. Consider the following grammar
 $E \rightarrow E \uparrow T \mid T$
 $T \rightarrow F + T \mid F$
 $F \rightarrow id$

\uparrow has less precedence than +
 \uparrow is left associative

$id > + > \uparrow$
 right left

~~(a)~~ \uparrow has higher precedence than +
~~(b)~~ + has lower precedence than \uparrow
~~(c)~~ \uparrow has lower precedence than +
~~(d)~~ id has lower precedence than \uparrow and +

11. Given the following grammar
 $E \rightarrow E * F / F + E / F$
 $F \rightarrow F - F / id$

Which of the following is true?
 (a) $* > +$
 (b) $- > *$
 (c) $+ = -$
 (d) $+ > *$

12. Consider the following left-associative

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(a) $A \rightarrow Sa/b$
 $S \rightarrow bdS^1$
 $S \rightarrow cS^1/adS^1/\epsilon$

(b) $A \rightarrow Sa/b$
 $S \rightarrow bdS^1$
 $S^1 \rightarrow cS^1/adS^1$

(c) $S \rightarrow bdS'$
 $S^1 \rightarrow cS^1/adS^1/\epsilon$
 $A \rightarrow ScaA^1/bA^1$
 $A^1 \rightarrow daA^1/\epsilon$

(d) None

08. Consider the following expression grammar
 G:
 $E \rightarrow E - T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$

Which of the following grammars is not left recursive, but is equivalent to G?

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(b) $E \rightarrow TE'$
 $E' \rightarrow TE' \mid \epsilon$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$

(c) $E \rightarrow TX$
 $X \rightarrow TX \mid \epsilon$

(d) $E \rightarrow TX \mid (TX)$
 $X \rightarrow TX + TX \mid \epsilon$

10. Consider the following grammar
 $E \rightarrow E \uparrow T \mid T$
 $T \rightarrow F + T \mid F$
 $F \rightarrow id$

\uparrow has less precedence than +
 \uparrow is left associative

$id > + > \uparrow$
 right left

~~(a)~~ \uparrow has higher precedence than +
~~(b)~~ + has lower precedence than \uparrow
~~(c)~~ \uparrow has lower precedence than +
~~(d)~~ id has lower precedence than \uparrow and +

11. Given the following grammar
 $E \rightarrow E * F / F + E / F$
 $F \rightarrow F - F / id$

$(* = +)$ low
 $-$ high

Which of the following is true?
 (a) $* > +$
 (b) $- > *$
 (c) $+ = -$
 (d) $+ > *$

12. Consider the following left-associative

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(a) $A \rightarrow Sa/b$
 $S \rightarrow bdS'$
 $S \rightarrow cS'/adS'/\epsilon$

(b) $A \rightarrow Sa/b$
 $S \rightarrow bdS'$
 $S' \rightarrow cS'/adS' \cdot$

(c) $S \rightarrow bdS'$
 $S' \rightarrow cS'/adS'/\epsilon$
 $A \rightarrow ScaA'/bA'$
 $A' \rightarrow daA'/\epsilon$

(d) None

10. Consider the following grammar

$E \rightarrow E \uparrow T / T$
 $T \rightarrow F + T / F$
 $F \rightarrow id$

\uparrow has less precedence than +
 \uparrow is left associative

11. Given the following grammar

$E \rightarrow E * F / F + E / F$
 $F \rightarrow F - F / id$

$*$ has higher precedence than +
 $+$ has lower precedence than \uparrow
 \uparrow has lower precedence than +
 id has lower precedence than \uparrow and +

Which of the following is true?
 $* > +$
 $+ = -$
 $- > *$
 $+ > *$

12. Consider the following left-associative

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13. Evaluate the following expression considering the given rules:
 $3 - 2 * 4 \$ 1 * 2 \$ 3$
 Where \$ mean exponentiation

(a) (-) highest followed by (*) and then followed by (\$) and all are left associative
 (b) (-) highest followed by (*) and then followed by (\$) and all are right associative
 (c) (\$) highest followed by (-) and then followed by (*) and all are left associative

(d) $a < b < c$
 $a < c < b$
 $c < a < b$
 $c < b < a$

14. Choose the correct statement?
 (a) a bottom up parsing technique simulates a rightmost derivation
 (b) a top down parsing technique simulates the reverse of a leftmost derivation
 (c) a bottom up parsing technique building

17. Untitled Poll

1. Question (Single Choice)

A 23%
 B 65%
 C 4%
 D 8%

You did not answer this question

19. FOLLOW (B) in the following grammar
 $A \rightarrow BCD$

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$c) 3-2+4+8$
 $1+4+8$
 $3+2$
 $c < a < b$

(a) $a < b < c$
 (c) $a < c < b$
 (b) $c < a < b$
 (d) $b < c < a$

14. Choose the correct statement?

☒ (a) a bottom up parsing technique simulates a rightmost derivation
☒ (b) a top down parsing technique simulates the reverse of a leftmost derivation
☒ (c) a bottom up parsing technique building the derivation tree in bottom up and simulates a rightmost derivation in reverse
☒ (d) a top down parsing technique simulates building the derivation tree in top down and simulates a leftmost derivation in reverse

15. Which of the following is true?

(a) Brute force technique is a SR parser.
 (b) Operator precedence parser is a Top down parser
 (c) Recursive descent parser is a Bottom up

A $\rightarrow aA \mid c$
 B $\rightarrow b \mid \epsilon$
 C $\rightarrow c$
 FIRST (A) \cap FOLLOW (A) is
 (a) {a} (b) {b}
 (c) {c} (d) None

19. FOLLOW (B) in the following grammar

A $\rightarrow BCD$
 B $\rightarrow w \mid Bx$
 C $\rightarrow yCz \mid m$
 D $\rightarrow DB \mid a$
 (a) {x, y, m, \$}
 (c) {x, w, m, \$}
 (b) {x, y, w, \$}
 (d) {x, y, m, w, \$}

20. $S \rightarrow [SX] \mid a$
 $X \rightarrow \epsilon \mid +SY \mid Yb$
 $Y \rightarrow \epsilon \mid -SXc$
 Then FOLLOW (S) is

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Q.36 If G is a grammar with productions

$$S \rightarrow SaS \mid aSb \mid bSa \mid SS \mid \epsilon$$

where S is the start variable, then which one of the following strings is not generated by G ? (Gate-2017) (2m)

☒ (a) ~~abab~~
☒ (b) ~~babab~~
☒ (c) ~~babba~~
☒ (d) ~~babba~~

a)
 b)
 c)
 d)

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