COMPILER DESIGN

SOLUTIONS

1.

$S \rightarrow aA \mid *S$
$A \rightarrow +S \mid (S \mid \varepsilon$

Set { +, (} will be in the

(a) First (A)   (b) First (E)
(c) Follow (E)   (d) Follow (A)

Solution: Option (a)

Explanation:

$S \rightarrow aA \mid *S$
$A \rightarrow +S \mid (S \mid \varepsilon$

First(S) = {a, *}, First(A) = {+, (, ε}
Follow(S) = {$}, Follow(A) = {$}

2. Which of the following is True?

(a) Handle of a string is a sub string that matches left hand side of production
(b) RR conflicts never occur in LALR(1)
(c) SR conflicts occur in LALR(1)
(d) None of these

Solution: Option (d)

Explanation:

(a) False, Handle matches on R.H.S.
(b) False, RR conflicts occur in LALR(1) during merging of states.
(c) False, SR conflict does not occur in LALR(1)

So, Ans- (d).

3. If attribute can be evaluated in depth-first order then definition is

(a) S – attributed (b) L – attributed
(c) Both (a) and (b) (d) None of these

Solution: Option (b)

Explanation:

So, Ans-(b) By definition.

4. S → Sa | b

Which of the following is True?

(a) There will be SR conflict during parsing
(b) There will be RR conflict during Parsing
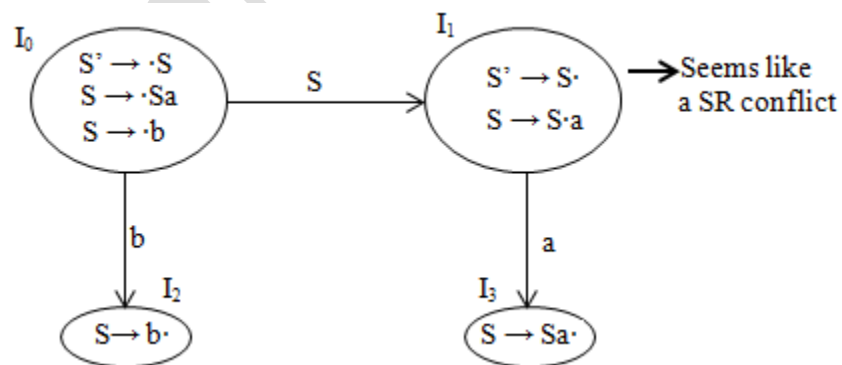(c) There will be both conflict
(d) There will be no conflict

Solution: Option (d)

Explanation:

S → Sa | b
Take S' → S as Augmented production
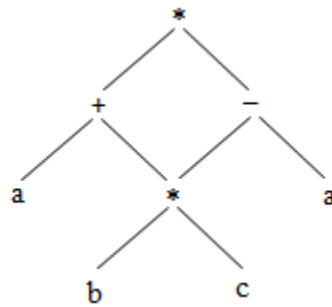
So, LR(0) items will contain

In I(1) stage it seems like a SR-conflict but it's not.
If conflict occurs for augmented production we don't consider it.

So, Ans - (d) No conflict.

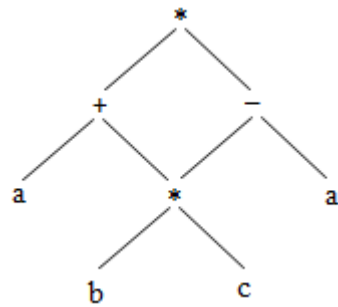**5.** The equivalent expression for the DAG is

(a) ((a + b) *c) *(b*(c − a))　　　　　　　　(b) a + (b*c − a)
(c) (a + (b*c))*((b*c) − a)　　　　　　　　(d) a*(a + b * c) − a

Solution: Option (c)

Explanation:

Equivalent DAG is (a+ (b*c))*((b*c) − a)

6.

$P \rightarrow P\alpha Q \mid Q$
$Q \rightarrow Q\beta R \mid R$
$R \rightarrow num$

If $2\alpha 3\alpha 4\beta 1\alpha 2\beta 1$ is evaluated to 18, then which of the following is the correct value for α and β?

(a) +, *　　　　　　　　　　　　　　　　　(b) +, −
(c) *, −　　　　　　　　　　　　　　　　　(d) −, +

Solution: Option (c)
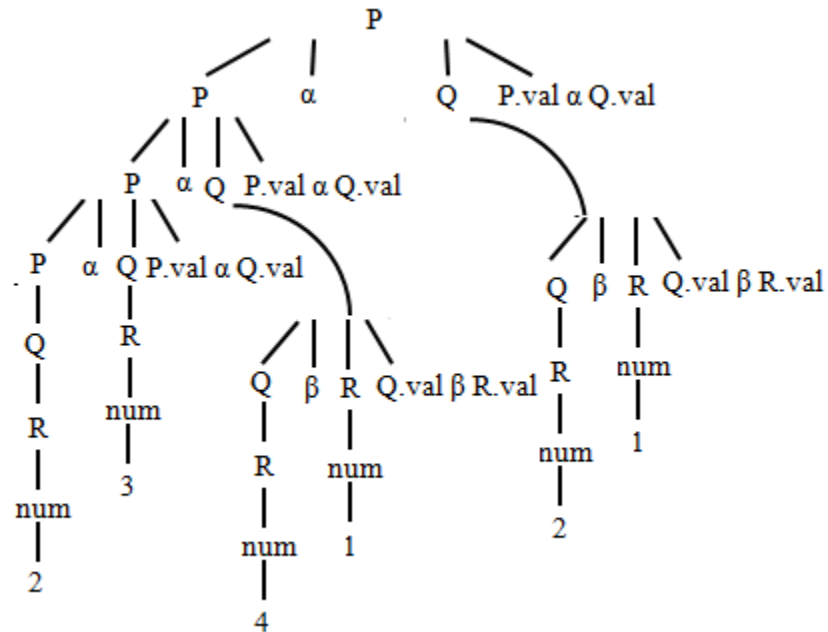
Explanation:
$P \rightarrow P\alpha Q \mid Q$
$Q \rightarrow Q\beta R \mid R$
$R \rightarrow num$

String is 2α3α4β1α2β1

**Adding semantic rules beside every production would be better
Like P-P alpha Q{P.val = P.val alpha Q.val}

{(2α3)α(4β1)}α{2β1}

If α = +, β = *, value is = (2+3) + (4×1) + (2×1) = 5 + 4 + 2 = 11
　α = +, β = −, value is = (2+3) + (4 − 1) + (2 − 1) = 5 + 3 + 1 = 9
　α = *, β = −, value is = (2*3) * (4 − 1) * (2 − 1) = 6 × 3 × 1 = 18

7. The above transition rule used to evaluate 7α4β2α2β1. The result will be

(a) 10   (b) 14
(c) 17   (d) 20

Solution: Option (b)

Explanation:

{7× (4 − 2)} × {2 − 1} = 14 × 1 = 14

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                        P
                   /    |     \    \
                  P     X      Q    {X}
               /  | |  \     / | |  \
              P   X Q  {X}  Q  - R  {-}
              |  / | | \    |    |
              Q Q  - R {-}  R    1
              | |    |   |  |
              R R    2   R  2
              |   |
              7   4
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