

Q.1  $S \rightarrow AbC / ad$   
 $A \rightarrow eS / Cx$   
 $C \rightarrow f / p$

Sol  $FIRST(C) \rightarrow \{f, p\}$   
 $Follow(C) \rightarrow \{\$, x\}$   
 $FIRST(A) \rightarrow \{e, f, p\}$   
 $Follow(A) \rightarrow \{b\}$   
 $FIRST(S) \rightarrow \{e, f, p, a\}$   
 $Follow(S) \rightarrow \{\$\}$

Q.2  $S \rightarrow XYZ / ZbY / Ya$   
 $X \rightarrow da / YZ$   
 $Y \rightarrow g / \epsilon$   
 $Z \rightarrow h / \epsilon$

Sol  $FIRST(Z) \rightarrow \{h, \epsilon\}$   
 $FIRST(Y) \rightarrow \{g, \epsilon\}$   
 $FIRST(X) \rightarrow \{d, h, g, \epsilon\}$   
 $FIRST(S) \rightarrow \{d, h, g, \epsilon\} \cup \{h, b\} \cup \{g, a\}$   
 $\rightarrow \{d, h, g, b, a, \epsilon\}$   
 $Follow(S) \rightarrow \{\$\}$   
 $Follow(X) \rightarrow \{g, h, \$\}$   
 $Follow(Y) \rightarrow \{h, \$, a, g\}$   
 $Follow(Z) \rightarrow \{\$, b, g, h\}$



Q.3  $S \rightarrow aXYb$

$X \rightarrow c/\epsilon$

$Y \rightarrow d/\epsilon$

$FIRST(Y) \rightarrow \{d, \epsilon\}$

$FIRST(X) \rightarrow \{c, \epsilon\}$

$FIRST(S) \rightarrow \{a\}$

$Follow(S) \rightarrow \{\$ \}$

$Follow(X) \rightarrow \{c, b\}$

$Follow(Y) \rightarrow \{b\}$

~~Follow~~

Q.4  $S \rightarrow aAB/bA/\epsilon$

$A \rightarrow aAb/\epsilon$

$B \rightarrow bB/\epsilon$

~~sol~~  $FIRST(B) \rightarrow \{b, \epsilon\}$

$FIRST(A) \rightarrow \{a, \epsilon\}$

$FIRST(S) \rightarrow \{a, b, \epsilon\}$

$FOLLOW(S) \rightarrow \{\$ \}$

$FOLLOW(A) \rightarrow \{b, \$ \}$

$FOLLOW(B) \rightarrow \{\$ \}$

Q.5  $E \rightarrow 10 * T / 5 + T$

$T \rightarrow PS$

$S \rightarrow QP / E$

$Q \rightarrow + / *$

$P \rightarrow a / b / c$

$FIRST(P) \rightarrow \{a, b, c\}$

$FIRST(Q) \rightarrow \{+, *\}$

$FIRST(S) \rightarrow \{+, *, a, b, c, 10, 5\}$

$FIRST(T) \rightarrow \{a, b, c, +, *, 10, 5\}$

$FIRST(E) \rightarrow \{10, 5\}$

$FOLLOW(E) \rightarrow \{\$ \}$

$FOLLOW(T) \rightarrow \{\$ \}$

$FOLLOW(S) \rightarrow \{\$ \}$

$FOLLOW(Q) \rightarrow \{a, b, c\}$

$FOLLOW(P) \rightarrow \{+, *, a, b, c, 10, 5\}$



$$Q6 \quad S \rightarrow ABC$$

$$A \rightarrow a / b b D$$

$$B \rightarrow a / \epsilon$$

$$C \rightarrow b / \epsilon$$

$$D \rightarrow c / \epsilon$$

$$\text{Sol} \quad \text{FIRST}(D) \rightarrow \{\epsilon, c\}$$

$$\text{FIRST}(C) \rightarrow \{b, \epsilon\}$$

$$\text{FIRST}(B) \rightarrow \{a, \epsilon\}$$

$$\text{FIRST}(A) \rightarrow \{a, b\}$$

$$\text{FIRST}(S) \rightarrow \{a, b\}$$

$$\text{Follow}(S) \rightarrow \{\$ \}$$

$$\text{Follow}(A) \rightarrow \{a, b, \$ \}$$

$$\text{Follow}(B) \rightarrow \{b, \$ \}$$

$$\text{Follow}(C) \rightarrow \{\$ \}$$

$$\text{Follow}(D) \rightarrow \{a, b, \$ \}$$