

1.

$q_0 \rightarrow aq_0 \mid bq_1;$

$q_1 \rightarrow aq_2$

$q_2 \rightarrow bq_3$

$q_3 \rightarrow aq_3 \mid \lambda$

2.  $q_3 \rightarrow q_3a \mid q_2b$

$q_2 \rightarrow q_1a$

$q_1 \rightarrow q_0b$

$q_0 \rightarrow q_0a \mid \lambda$

3. -

4. -

5.  $Y \rightarrow xb$

$x \rightarrow xa \mid sa \mid ya$

$s \rightarrow sb \mid yb \mid \lambda$

6.  $X \rightarrow bx \mid ay$

$y \rightarrow ay \mid bz$

$z \rightarrow as \mid bx$

$s \rightarrow as \mid bs$