

6.30

Answer:

For each operation, we give the tuple calculus expression followed by the domain calculus expression.

(a) $\{ t \mid R(t) \text{ AND } t.A=c \}$, $\{ xyz \mid R(xyz) \text{ AND } x=c \}$

(b) $\{ t.A, t.B \mid R(t) \}$, $\{ xy \mid R(xyz) \}$

(c) $\{ t.A, t.B, t.C, q.D, q.E \mid R(t) \text{ AND } S(q) \text{ AND } t.C=q.C \}$,
 $\{ xyzvw \mid R(xyz) \text{ AND } (\text{EXISTS } u) (S(uvw) \text{ AND } z=u) \}$

(d) $\{ t \mid R(t) \text{ OR } S(t) \}$,
 $\{ xyz \mid R(xyz) \text{ OR } S(xyz) \}$

(e) $\{ t \mid R(t) \text{ AND } S(t) \}$,
 $\{ xyz \mid R(xyz) \text{ AND } S(xyz) \}$

(f) $\{ t \mid R(t) \text{ AND NOT}(S(t)) \}$,
 $\{ xyz \mid R(xyz) \text{ AND NOT}(S(xyz)) \}$

(g) $\{ t.A, t.B, t.C, q.D, q.E, q.F \mid R(t) \text{ AND } S(q) \}$,
 $\{ xyzuvw \mid R(xyz) \text{ AND } S(uvw) \}$

(h) $\{ t.B \mid R(t) \text{ AND } (\text{FORALL } s)$
 $(\text{NOT}(S(s)) \text{ OR } (\text{EXISTS } q) (R(q) \text{ AND } s.A=q.A \text{ AND } q.B=t.B)) \}$,
 $\{ y \mid R(xy) \text{ AND } (\text{FORALL } z) (\text{NOT}(S(z)) \text{ OR } (\text{EXISTS } u) (R(uy) \text{ AND } z=u)) \}$