

a. $\pi_{Ename} \sigma_{E.SSN=W.SSN} (E \times W \times P)$
 $\wedge W.Pno = P.Pnumber$
 $\wedge W.hours > 15$
 $\wedge P.Pname = "X"$

b. $\pi_{Ename} \sigma_{E.SSN=W.ESSN} (E \times W \times P \times De)$
 $\wedge W.Pno = P.Pnumber$
 $\wedge E.SSN = De.ESSN$
 $\wedge W.hours > 15$
 $\wedge P.Pname = "X"$

c. $\pi_{SSN} \sigma_{E.SSN=W.ESSN} (E \times W \times P) - \pi_{SSN} \sigma_{E.SSN=W.ESSN} (E \times W \times P)$
 $\wedge W.Pno = P.Pnumber$
 $\wedge P.Plocation = "Brooklyn"$ $\wedge W.Pno = P.Pnumber$
 $\wedge P.Plocation = "Long Island"$

d. $\rho(E_1, E)$
 $\rho(E_2, E)$
 $\rho(E_3, \pi_{E_1.SSN} (\sigma_{E_1.SSN \neq E_2.SSN} E_1 \times E_2))$
 $E_1.Ename \wedge E_1.Salary > E_2.Salary$

$\pi_{Ename} (\pi_{SSN} E - E_3)$

e. $\rho(E_1, E)$
 $\rho(E_2, E)$

$\pi_{E_1.Ename} \sigma_{E_1.Superior.SSN=E_2.SSN} (E_1 \times E_2)$
 $\wedge E_1.Salary > E_2.Salary$

$$f. \pi_{Ename} \delta_{E.SSN=De.ESSN} (E \times De) \\ \wedge E.Ename = De.D_name$$

$$g. \pi_{Ename, SSN, Pno} \delta_{E.SSN=W.ESSN} (E \times W) \div \pi_{Pnumber} (P)$$

$$h. \rho(T_1(ESSN, \overset{cnt}{Pno}), ESSN \text{ } G_{COUNT(Pno)}(W))$$

$$\pi_{Ename} \delta_{T_1.ESSN=E.ESSN} (G_{cnt=2}(T_1) \times E)$$

i

P	B
10	a.

j

P	r.B	R	s.B	A	C
10	a	5	b	10	6
10	a	5	c	25	3
10	a	5	b	10	5
15	b	8	b	10	6
15	b	8	c	25	3
15	b	8	b	10	5
25	a	6	b	10	6
25	a	6	c	25	3
25	a	6	b	10	5

k.

P	r.B	R	s.B	A	C
15	b	8	b	10	6
15	b	8	b	10	5

l.

P	r.B	R	s.B	A	C
10	a	5	b	10	6

m.

P	r.B	R	s.B	A	C
25	a	6	c	25	3

h.

$$\frac{B}{a}$$

i.

$$\emptyset$$

P. Not union compatible

q.

$$\frac{P}{10} \quad \frac{R}{5}$$