题一、

1. $\Pi_{(PNO)}(SPJ \bowtie \sigma_{city="LONDON"}(J) \bowtie \sigma_{city="LONDON"}(S))$

2. $\Pi_{(PNO)}(\Pi_{(SNO,CITY)}(S) \bowtie \Pi_{(JNO,CITY)}(J) \bowtie \Pi_{(SNO,PNO,JNO)}(SPJ))$

3. $\Pi_{(JNAME)}(\Pi_{(JNO)}(\sigma_{SNO="S1"}(S) \bowtie SPJ) \bowtie J)$

4. $\Pi_{(JNAME)}(\sigma_{(COLOR="red")}(\Pi_{(PNO,COLOR)}(P)) \bowtie \Pi_{(SNO,PNO,JNO)}(SPJ) \bowtie J)$

5. $\Pi_{(JNAME,PNO)}(J \bowtie SPJ) \div \Pi_{(PNO)}(P)$

6. $\Pi_{(SNAME,PNO)}(S \bowtie SPJ) \div (P1 \cup P2)$

7. $\Pi_{(PNAME)}(\Pi_{(COLOR)}(\sigma_{PNAME="TV"}(P)) \bowtie P)$

题二、

1. $\Pi_{(Sno,Sname)}(\sigma_{Cname="数学"}(C) \bowtie SC \bowtie S)$

2. $\Pi_{(Sno)}(\sigma_{Cno=1}(C) \bowtie SC) \cap \Pi_{(Sno)}(\sigma_{Cno=3}(C) \bowtie SC)$

3. $\Pi_{(Sno,Sname,Age)}(\sigma_{18 \leq Age \leq 20 \cap sex="女"}(S))$

4. $\Pi_{(Sno,Sname,Grade)}(\sigma_{Cname="数据库"}(C) \bowtie SC)$

5. $\Pi_{(Sname,SD,Cno)}(S \bowtie SC) \div \Pi_{(Cno)}(C)$

6. $\Pi_{(Sname,SD,Cno)}(S \bowtie SC) \div \Pi_{(Cno)}(C) - \Pi_{(Sname,SD)}(\sigma_{Cno="2"}(C) \bowtie C \bowtie S)$

题三、

R1:

A	B	C	D
9	a	E	f
7	g	e	f

R2

A	D
2	d
7	d

R3:

A	D
2	d
7	d
9	f
2	f
9	e
7	f
8	f

R4:

A	D
9	f
2	f
9	e
7	f

R5:

A	B	C	D
2	b	c	d
7	g	c	d

R6:

R.A	B	R.C	R.D	W.A	W.C	W.D
7	g	e	f	2	c	d
7	g	c	d	2	c	d

R7:

A	B
2	b
7	g