Task 1.

1) $\prod_{\text{employee.id, employee.person\_name}}$
$(\sigma_{\text{comp\_name="BigBank"}}(\text{employee} \bowtie_{\text{employee.person\_name = works.person\_name}} \text{works}))$

2) $\prod_{\text{employee.id, employee.person\_name, employee.city}}$
$(\sigma_{\text{comp\_name="BigBank"}}(\text{employee} \bowtie_{\text{employee.person\_name = works.person\_name}} \text{works}))$

3) $\prod_{\text{employee.id, employee.person\_name, employee.city}} (\sigma_{\text{comp\_name="BigBank" } \wedge \text{ salary > 10000}}(\text{employee} \bowtie_{\text{employee.person\_name = works.person\_name}} \text{works}))$

4) $\prod_{\text{employee.id, employee.person\_name}}(w \bowtie_{\text{(w.city = company.city) } \wedge \text{ } (\rho w (\text{employee} \bowtie \text{employee.person\_name = works.person\_name works).company\_name = company.company\_name})} \text{company}))$

Task 2.

1) $\prod_{\text{employee.id, employee.person\_name}}$
$(\sigma_{\text{comp\_name≠"BigBank"}}(\text{employee} \bowtie_{\text{employee.person\_name = works.person\_name}} \text{works}))$

2) $\prod_{\text{employee.id, employee.person\_name}} (\sigma_{\text{salary >= min(} \prod \text{salary(w))}} (\rho w (\text{employee} \bowtie_{\text{employee.person\_name = works.person\_name}} \text{works})))$

Task 3.

1) Insert value in attribute dept_name in relation instructor which already exists.

2) Insert value into department relation which does not exist in the attribute dept_name in instructor relation.

3) Delete value of attribute dept_name in instructor relation which exists in department relation.

Task 4.

Relation employee: person_name;

Relation works: person_name, company_name;

Relation company: company_name;