1) $\tau(\pi_{name,city}(\sigma_{annuallbudget>3million}(hosipital)))$

2)

$\delta(\pi_{firstname,lastname,gender,birthday}(\sigma_{age\leq 40,city=toronto,disease=cancer}(patient)))$

3) a) $\gamma_{specialty,avg(salary)\rightarrow salary}(physician)$

b)

$\gamma_{count(physician)\geq 5}(\gamma_{specialty,avg(salary)\rightarrow salary}\ (\sigma_{city=toronto\ or\ city=hamilton}(physician))$

)

c) $\tau_{yearofservice}(\gamma_{specialty,avg(salary)\rightarrow salary}(nurse))$

4)

$\gamma_{hospital,count(patientID)\rightarrow number}(\sigma_{date\ between\ 2017-08-05\ and\ 2017-08-10}(addmission))$

5) a) $\delta(\pi_{dname}(\sigma_{count(dname)=count(hname)}(department)))$

b) $\gamma_{DName,HName,\max(\ count(nurseID)+count(physicianID))\rightarrow stuffnumber}\ (nursework\ \times$

$physician \times department))$

c) $R :=\ \gamma_{DName,count(DName)\rightarrow c}(Department)$

$\delta(\pi_{DName}(\sigma_{c=1}(R\ \times\ department)))$

6) a) $R1 :=\ \pi_{nurseID}(\gamma_{nurseID,count(patientID)<3\rightarrow c}(patient))$

$R2 := \pi_{firstname,lastname}(\sigma_{id=R1.nurseID}(person, R1))$

b) $R3 := \delta\pi_{patientID}(\sigma_{R1.nurse=p.nurseID}\ (R1\ \times patient))$

$\delta\sigma_{prognosis.patientID=R3.patientID}(R3\ \times prognosis)$

7) $R := \gamma_{date,\ (count(patientID))}(\sigma_{HName=Hamilton\ General\ Hopsital}$(admission))

$\gamma_{\max(revenue)}(R)$

8) $p := \gamma_{drugcode,count(drugcode)\rightarrow c}(prescription)$

$R := \gamma_{drugcode,drugname,(count(p.c))\rightarrow revenue}(p \times drug)$

$\gamma_{\max(revenue)}(R)$

9) $\pi_{d.patientID,p.firstName,p.lastname,p.gender}$

$(\sigma_{d.patientID=p.id\ and\ d.disease=Diabetes\ and\ t.tesId=m.testID\ and\ m.Name\ !=red\ blood\ and\ m.Name\ !=Lymphocytes\ and\ d.patientId=t.patientID}$

$(diagnose\ d \times take\ t \times medicaltest, person)))$

10) a) $\delta(\pi_{d.physicianID,d.disease,d.prognosis}($

$\sigma_{p.DName=intensive\ Care\ Unit\ and\ p.HName=mcmaster\ university\ centre\ and\ p.physicianID=d.physicianID}$

$(physician\ p \times diagnose\ d))))$

10) b) $R := \delta\pi_{d.patientID}($

$\sigma_{p.DName=intensive\ Care\ Unit\ and\ p.HName=mcmaster\ university\ centre\ and\ p.physicianID=d.physicianID}$

$(physician\ p \times diagnose\ d))$

$\tau_{total\ desc}\gamma_{\text{pa.patientID, sum(d.unitcost)}}(R)$

10) c)

$R := \delta\pi_{d.patientID}($

$\sigma_{p.DName=intensive\ Care\ Unit\ and\ p.HName=mcmaster\ university\ centre\ and\ p.physicianID=d.physicianID}$

$(physician \times diagnose))$

$\gamma_{pa.patientID,sum(unitcost)\rightarrow total}(\sigma_{p.drugcode=d.drugcode\ and\ pa.patientID=p.patientID\ and\ patientID\ in\ R}(prescription$
$\times drug\ d \times patient\ pa))$

11) $R1 :=$

$$\delta\gamma_{patientID,count(Hname)\rightarrow c}\sigma_{category=urgent\ or\ category=standard}(admission)$$

$$R2 := \pi_{patientID}\left(\sigma_{c=2}(R1)\right)$$

$$\pi_{id,firstName,lastName}\sigma_{id\ in\ R2}(person)$$