Name_____ Roll No. _____

Question 1

```
SELECT d.enum as Driver, t.TNUM, td.DESTINATION,td.DEPARTURE FROM driver d join trip t
 on d.LNUM=t.LNUM join tripleg td on t.TNUM=td.TNUM where t.TNUM=1
 union
 SELECT d.enum as Driver, t.TNUM, td.DESTINATION,td.DEPARTURE FROM driver d join trip t
 on d.LNUM=t.LNUM join tripleg td on t.TNUM=td.TNUM where t.TNUM=8;
```

$\Pi_{d.enum\ as\ Driver,\ t.TNum,\ td.DESIGNATION,\ td.DEPARTURE}(\sigma_{t.TNum=1}(P(d)\,driver \underset{d.LNum=t.LNum}{|\times|} P(t)\,trip \underset{t.TNum=td.TNum}{|\times|} P(td)\,trip$

$\cup$

$\Pi_{d.enum\ as\ Driver,\ t.TNum,\ td.DESIGNATION,\ td.DEPARTURE}(\sigma_{t.TNum=8}(P(d)\,driver \underset{d.LNum=t.LNum}{|\times|} P(t)\,trip \underset{t.LNum=td.TNum}{|\times|} P(td)\,trip$

Question 2

```
select tl.TNUM as Trip_Number,
       (select t.lnum from trip t where t.TNUM = tl.TNUM) as License_Number,
    (select d.enum from driver d where d.lnum = (select t.lnum from trip t where t.TNUM =
tl.TNUM) ) as Driver ,
    tl.DEPARTURE, tl.DESTINATION from tripleg tl  where tl.TNUM in(1,8);
```

$\Pi_{tl.TNUM\ as\ Trip\_Num,\ (\Pi_{t.lnum}(\sigma_{t.TNum=tl.TNum} P(t)\,trip)\ As\ License\_Num}$

$\Pi_{d.enum}(\sigma_{d.lnum=(\Pi_{t.lnum}(\sigma_{t.TNum=tl.TNum} P(t)\,trip)\ as\ Drive,\ Drive}$

$tl.DEPARTURE, t.DESIGNATION(\sigma_{tl.TNum\ in(1,8)} P(t)\,tripleg$

Question 3

```
select fname,lname from employee e where exists (select enum from driver d where exists
(select lnum from trip where year(TDATE)=2017 and lnum=d.lnum) and enum=e.enum);
```

$\Pi_{fname,lname}(\sigma_{exists}\,\Pi_{enum}(\sigma_{exists}(\Pi_{enum}(\sigma_{year(TDATE)=2017 \wedge lnum=d.lnum}$

$P(e)\ Employee)$

Question 4

```
select e.FNAME, e.LNAME from EMPLOYEE e inner join driver d on e.enum=d.enum inner join
trip t on d.LNUM = t.LNUM where T.TDATE like '2016-01%'
```

$\Pi_{e.FNAME, e.LNam}\left(\sigma_{T.TDATE\ like\ '2016\text{-}01\%'}\left(\rho(e)\,EMPLOYEE \bowtie_{e.enum=d.enum} \rho(d)\,driver\right) \bowtie_{d.LNUM=t.LNUM} \rho(t)\,trip\right)$

Question 5

```
select REGNUM,count(REGNUM) No_of_trips from trip group by REGNUM
```

$\gamma_{REGNUM,\ count(REGNUM)\ As\ No.of\ trip}(trip)$

Type of operators

Selection σ

Projection π

Generalize Projection γ

Rename ρ

~~Join, Equi~~, Natural Join $\bowtie$

Group by $\rightarrow \gamma$

Join $\bowtie_{condition}$

Left outer Join $\bowtie$

Right outer Join $\bowtie$

Full Join $\bowtie$

Assignment $\leftarrow$

Union $\cup$

Intersection $\cap$

Difference $-$

Difference : $\div$