AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course No: CSE4125

Course Title: Distributed Database Systems

Fall 2021 | Assignment | Marks 20

1. Consider the following global relational schemata.

EMP (ID, NAME, SAL, AGE)

DEPT (ID, AREA, DEPTNUM, MGRNUM)

Corresponding fragmentation schemata:

$EMP_1 = SL_{SAL \leq 25K} EMP$

$EMP_2 = SL_{SAL > 25K} EMP$

$DEPT_1 = SL_{MGRNUM >= 375} DEPT$

$DEPT_2 = SL_{MGRNUM < 375} DEPT$

Also consider the following global query.

$$\Big(\big((SL_{SAL > 25K}\ \boldsymbol{EMP}\ JN_{ID = ID}\ \boldsymbol{DEPT}\big)\ DF\ \big(SL_{AGE \leq 25}\ \boldsymbol{EMP}\ JN_{ID=ID}\ \boldsymbol{DEPT}\big)\Big)\ NJN\ \big(\boldsymbol{EMP}\ JN_{ID=ID}\ \boldsymbol{DEPT}\big)\Big)$$
$$DF\ \big(SL_{SAL > 25K\ \ AND\ \ AGE > 25}\ \boldsymbol{EMP}\ JN_{ID=ID}\ \boldsymbol{DEPT}\ \big)$$

Now, answer the following questions.

i. Draw the *operator tree*.

ii. Perform step-by-step transformations to simplify the operator tree, indicating which rule and criterion is applied at each step.

iii. Transform the simplified query into fragment query by applying canonical expression based on the given fragmentation schema.

iv. Write the equivalent query obtained from the simplified tree.