TRANSPORTATION PROBLEM

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SUMMARY: Objective Function:Minimize TC=622x11+614x12+630x13+ 641x21+645x22+649x23

Subject to Constraints[Supply]:x11+x12+x13>=100 x21+x22+x23>=120 [Demand]:x11+x21>=80 x12+x22>=60 x13+x23>=70

Now, Subject to Non-Negativity Constraints: xij=0,where i=1,2 and j=1,2,3
***

#Loading Packages

```
library(Matrix,warn.conflicts = FALSE)
library(lpSolve,warn.conflicts = FALSE)
```

#Building the matrix of the given problem

```
transmatrix <- matrix(c(22,14,30,600,100,
                        16,20,24,625,120,
                        80,60,70,"-","210/220"),ncol=5,nrow=3,byrow = TRUE)
colnames(transmatrix) <- c("Warehouse1","Warehouse2","Warehouse3",
                           "Production Cost","Production Capacity")
rownames(transmatrix) <- c("PlantA","PlantB","Monthly Demand")
transmatrix <- as.table(transmatrix)
transmatrix
```

```
##                Warehouse1 Warehouse2 Warehouse3 Production Cost
## PlantA         22         14         30         600
## PlantB         16         20         24         625
## Monthly Demand 80         60         70         -
##                Production Capacity
## PlantA         100
## PlantB         120
## Monthly Demand 210/220
```

```
new.transmatrix <- matrix(c(622,614,630,0,100,
                            641,645,649,0,120,
                            80,60,70,10,220),ncol=5,nrow=3,byrow=TRUE)

colnames(new.transmatrix) <- c("Warehouse1","Warehouse2","Warehouse3",
```

```
                                 "Dummy","Production Capacity")
rownames(new.transmatrix) <- c("PlantA","PlantB","Monthly Demand")
transmatrix <- as.table(new.transmatrix)
transmatrix
```

```
##                Warehouse1 Warehouse2 Warehouse3 Dummy Production Capacity
## PlantA                622        614        630     0                 100
## PlantB                641        645        649     0                 120
## Monthly Demand         80         60         70    10                 220
```

#The balanced values of the problem will be satisfied by this relation. The cost Matrix which we have created is shown below:

```
costs<-matrix(c(622,614,630,0,
                641,645,649,0),nrow = 2, byrow = TRUE)
costs
```

```
##      [,1] [,2] [,3] [,4]
## [1,]  622  614  630    0
## [2,]  641  645  649    0
```

#The values of the matrix of the row's Production Capacity side are as follows:

```
row.rhs<-c(100,120)
row.signs<-rep("<=",2)
```

#Here, we used the double variable 10 at the end to determines the dummy variable and also we used the values of the matrix from column's side Production Capacity are as follows:

```
col.rhs<-c(80,60,70,10)
col.signs<-rep(">=",4)
```

#In this chunk, we are going to use the LP Transport Command to run the code

```
lptrans<-lp.transport(costs,"min",row.signs,row.rhs,col.signs,col.rhs )
lptrans$solution
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    0   60   40    0
## [2,]   80    0   30   10
```

```
lptrans$objval
```

```
## [1] 132790
```

Conclusion:From the Above Code,we can conclude that our result is Z=132790.The result for each variable of both plants are as follows: 60x12 which is warehouse2 from plantA 40x13 which is warehouse3 from plantA 80x21 which is warehouse1 from plantB 30x23 which is warehouse3 from plantB 10x24 which is the 4rth variable is called as the "throw away variable".