

B.Sc. Part I (Hons)

PAPER - I

LINEAR PROGRAMMING

ASSIGNMENT PROBLEMS

Aim  $\rightarrow$  Assign tasks such that the total cost for doing all the jobs is minimum.

Objective  $\rightarrow$  Assign a number of persons to the same number of jobs at a minimum cost.

Example Solve the following assignment problem.

Persons $\rightarrow$	1	2	3	4
Tasks $\downarrow$ A	12	30	21	51
B	18	33	9	31
C	44	25	24	21
D	23	30	28	14

Solution First verify that the no. of tasks = no. of persons. Here it is equal.

(a) Now, find the lowest element in ~~the~~ each row:

In first row ( $R_1$ ), it is 12.

In  $R_2$ , it is 9, in  $R_3$  it is 21, in  $R_4$  it is 14.

(b) In ~~first~~ <sup>all</sup> rows, subtract the lowest-element of the respective row, i.e. reduce (or subtract) ~~from~~ [12 from each element of first row], [9 from each element of  $R_2$ , 21 from each element of  $R_3$  and 14 from each element of  $R_4$ ].

Hence, the matrix becomes

	1	2	3	4
A	0	18	9	39
B	9	24	0	22
C	23	4	3	0
D	9	16	14	0

(c) Do the similar step in each column. (i.e. subtract each element of  $C_i$  by its lowest element and others).

⇒

0	14	9	39
9	20	0	22
23	0	3	0
9	12	14	0

(d) Now, identify the single zero in each row.

	1	2	3	4
A	0	14	9	39
B	9	20	0	22
C	23	0	3	<del>0</del>
D	9	12	14	0

cross all zeros in the same column.

So, the zero in the third row and 4th column is crossed.

Hence,  $A \rightarrow 1$ ,  $B \rightarrow 3$ ,  $C \rightarrow 2$ ,  $D \rightarrow 4$ .