Quiz No 3

(1)

SE-2017-120
SEC B

Q1

NWC method

Y24044911087-

	W	X	Y	Z	Supply
A	4 (S_1/d_1)	2 (S_1/d_2)	4 (S_1/d_3)	0 (S_1/d_4)	50
B	1 (S_2/d_1)	4 (S_2/d_2)	9 (S_2/d_3)	1 (S_2/d_4)	80
C	1 (S_3/d_1)	0 (S_3/d_2)	8 (S_3/d_3)	7 (S_3/d_4)	20
demand	30	30	40	50	

	W	X	X	Z	Supply
A	$x_{11}=30$	$x_{12}=20$	–	–	50-30=20 20-20=0
B	–	$x_{22}=10$	$x_{23}=40$	$x_{24}=30$	80-10=70 70-40=30-30=0
C	–	–	–	$x_{34}=20$	20
Demand	30-30=0	30-20=10 10-10=0	40-40=0	50-30 =20	

S_1/d_1

$x_{11} = \min(50, 30)$

$V_u = 30$ $\quad S_1 - d_1 = 50 - 30 = 20$

S_1/d_2

$x_{12} = \min(20, 30)$

$x_{12} = 20$ $\quad d_2 - S_1 = 30 - 20 = 10$

S_2/d_2

$x_{22} = \min(80, 10)$

$x_{22} = 10$ $\quad S_2 - d_2 = 70$

S_2/d_3

$x_{23} = \min(70, 40)$

$x_{23} = 40$ $\quad S_2 - d_3 = 70 - 40 = 30$

S_2/d_4

$x_{24} = \min(30, 50)$

$x_{24} = 30$ $\quad d_4 - S_2 = 50 - 30 = 20$

Cost $= (30)\times 4 + (20)\times 2 + (10)\times 4 + (40)\times 9 + (30)\times [illegible] + (20)\times 7 = 730$

least cost method LCM

	W	X	Y	Z	Supply
A	4	2	4	0	50
B	1	4	9	1	80
C	1	0	8	7	20
Demand	30	30	40	50	

Solution

	W	X	Y	Z	S'
A	—	—	—	$x_{14}=50$	50-50=0
B	$x_{21}=30$	$x_{22}=10$	$x_{23}=40$	—	80-30=50 -10=40
C	—	$x_{32}=20$	—	—	20-20=0
Demand	30-30=0	30-20=10 10-10=0	40	50-50 =0	

S_1, d_4 is least value

$x_{14} = \min(50, 50)$

$x_{14} = 50$ $\quad S_1 - d_1 = 50 - 50 = 0$

S_3, d_2

$x_{32} = \min(20, 30)$

$x_{32} = 20$ $\quad d_2 - S_3 = 30 - 20 = 10$

S_2, d_1

$x_{21} = \min(80, 30)$

$x_{21} = 30$ $\quad S_2 - d_1 = 50$

S_2, d_2

$x_{22} = \min(50, 10)$

$x_{22} = 10$ $\quad S_2 - d_2 = 50 - 10 = 40$

S_2, d_3

$x_{23}(40, 40)$

$x_{23} = 40$ $\quad S_2 - d_3 = 0$

cost = $50(0) + (30) \times 1 + 10 \times 4 + 40 \times 9 + 20 \times 0 = 430$

Q No 2

hungarian algorithm

Roll No 120

	x	w	y	z
A	4	1	1	9
B	2	4	0	1
C	4	9	8	2
D	0	1	7	0

Roll No

Step 1

	x	w	y	z	
A	4	1	1	9	1
B	2	4	0	1	0
C	4	9	8	2	2
D	0	1	7	0	0

	x	w	y	z
A	3	0	0	8
B	2	4	0	1
C	2	7	6	0
D	0	1	7	0
	0	0	0	0

	x	w	x	z
A	3	0	0	8
B	2	4	0	1
C	2	7	6	0
D	0	1	7	0

(4)

Reduce cost matrix

	x	w	y	z
A	3	0	0	8
B	2	4	0	1
C	2	7	6	0
D	0	1	7	0

4 Lines

k=1 Smallest uncovered value is 1

So k=1

	x	w	y	z
A	3	0	1+1=2	7
B	1	3	-1	0
C	3	8	8+1=9	2-1=1
D	-1	0	7+1=8	0-1=-1

$x_{12} = 1$

$x_{23} = 1$

$x_{34} = 1$

$x_{42} = 1$

$x_{11}, x_{13}, x_{14} = 0$

$x_{21}, x_{22}, x_{231} = 0$

$x_{31}, x_{32}, x_{33}, x_{34} = 0$

$x_{41}, x_{43}, x_{44} = 0$

Cost = 1 + 1 + 1 = 3 A