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CLASS TIMMING :- MONDAY

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Q. Ans

MACHINES

		A	B	C	D	E
T	1	6	12	3	11	15
O	2	4	2	7	1	10
D	3	8	11	10	7	11
S	4	16	19	122	23	21
	5	9	5	7	6	10

MACHINES

	1	1	2	3	4	5	Row Maximum
1	6	12	3	11	15		3
2	4	2	7	1	10		1
3	8	11	10	7	11		7
4	16	19	122	23	21		16
5	9	5	7	6	10		5

Machines

	1	2	3	4	5	Row deduction
1	3	9	0	8	12	
2	3	1	6	0	9	
3	1	4	3	0	4	
4	0	3	106	7	5	
5	4	0	2	1	5	

column min 0 0 0 4

Q.No =

MACHINES

	1	2	3	4	5	col deduction
1	3	9	0	8	8	
2	3	1	6	0	5	
3	1	4	3	0	0	
4	0	3	106	7	1	
5	4	0	2	1	1	

Production

Jobs	Machines	Time
1	3	3
2	4	1
3	5	11
4	1	16
5	2	5
		36

Total processing time = 36 cr/hours.

$$\text{Min } z = 2x_1 + 3x_2$$

Subject to :-

$$\left(\frac{1}{2}\right)x_1 + \left(\frac{1}{4}\right)x_2 \leq 4$$

$$x_1 + 3x_2 \geq 20$$

$$x_1 + x_2 = 10$$

$$x_1, x_2 \geq 0$$

Sol:-

Solving the inequality by Big M

$$\frac{1}{2}x_1 + \frac{1}{4}x_2 + S_1 = 4$$

$$x_1 + 3x_2 - S_2 + A_1 = 20$$

$$x_1 + x_2 - S_3 + A_2 = 10$$

$$z = 2x_1 + 3x_2 + MA_1 + MA_2$$

$$z - 2x_1 - 3x_2 - MA_1 - MA_2 = 0$$

Now making the table

	x_1	x_2	S_1	S_2	S_3	A_1	A_2	z	
	$\frac{1}{2}$	$\frac{1}{4}$	1	0	0	0	0	0	4
	1	3	0	-1	0	1	0	0	20
	1	1	0	0	-1	0	1	0	10
	2	-3	0	0	0	-M	-M	1	0

∴ ing $R_4 - M$

	x_1	x_2	S_1	S_2	S_3	A_1	A_2	Z	
Pivot	$1/2$	$1/4$	1	0	0	0	0	0	4
	1	3	0	-1	0	1	0	0	20
	1	1	0	0	-1	0	1	0	16
	$-2/M$	$3/M$	0	0	0	0	1	$-1/M$	0

Pivot column

	x_1	x_2	S_1	S_2	S_3	A_1	A_2	Z	
	1	$1/2$	2	0	0	0	0	8	
	1	3	0	-1	0	1	0	20	
	1	1	0	0	-1	0	1	16	
	$-2/M$	$3/M$	0	0	0	1	1	$-1/M$	0

by $(R_1)_2$

	x_1	x_2	S_1	S_2	S_3	A_1	A_2	Z
	1	$1/2$	2	0	0	0	0	8
	0	$5/2$	-2	-1	0	1	0	12
	0	$1/2$	-2	0	-1	0	1	16
	0	$4/M$	$4/M$	0	0	1	1	$16/M$

$$R_2 \rightarrow R_2 - R_1$$

$$R_3 \rightarrow R_3 - R_1$$

$$R_4 \rightarrow (2/M)R_1 + R_4$$

$$x_1 = 8$$

$$A_1 = 12$$

$$A_2 = 2$$

Date:...../...../20.....

M T W T F S

$$x_1 = 0$$

$$s_1 = 0$$

$$s_2 = 0$$

$$s_3 = 0$$

Q:- 3 Ans 3)

Origin	Destination				Supply
	1	2	3	4	
1	20	22	17	4	120
2	24	37	9	7	70
3	32	37	20	15	50
Demand	60	40	30	110	240

by using Vogel's Approximation method.

1	2	3	4	Supply
20	22	17	4	120
24	37	9	7	70
32	37	20	15	50
60	40	30	110	240

Demand = Supply

Balanced transportation problem

	1	2	3	4					
	x	40	x	80	80				
1	20	22	17	4	120	13	(13)	-	
	10	x	30	30	46 ¹⁰				
2	24	37	9	7	76	2	2	2	(17)
	50	x	x	x					
3	32	37	20	15	50	5	5	5	17
	60	40	30	40					
	50	0	0	300					
	4	(15)	8	13					
	4	-8	8	3					
	8	-	(11)	8					
	8	-	-	8					

$$880 + 320 + 240 + 270 + 210$$

$$(40 \times 22) + (80 \times 4) + (10 \times 24) + (30 \times 9) + (30 \times 7) + \text{Haha}$$

$$(50 \times 32)_F = 3520$$

$$F = 3520$$