SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Com. - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - II
23PCOET2002 - Operations Research

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. A firm buys casting of P and Q type of parts and sells them as finished product after machinery, boring and polishing. The purchasing cost for castings are Rs.3 and Rs.4 each for parts P and Q and selling costs are Rs.8 and Rs.10 respectively. The per hour capacity of machines used for machinery, boring and polishing for two products is given below:

Capacity	**Parts**	
(per hour)	**P**	**Q**
Machinery	30	50
Boring	30	45
Polishing	45	30

The running costs for machinery, boring and polishing are Rs.30, Rs.22.5 and Rs.22.5 per hour respectively. Formulate the linear programming problem to find out the product mix to maximise the product.

2. Solve the following LPP, using Simplex method.
Max $z=5x_1 + 3x_2$
Subject to $3x_1 + 5x_2 \leq 15$
$5x_1 + 2x_2 \leq 10$
$x_1, x_2 \geq 0$

3. Describe the procedure for obtaining the initial solution to a transportation problem by north west corner rule.

4. Solve the following assignment problem

	1	**2**	**3**	**4**	**5**
A	20	15	25	25	29
B	13	19	30	13	19
C	20	17	14	12	15
D	14	20	20	16	24
E	14	16	19	11	22

Contd...

5. Find the minimum cost solution for the following transportation problem which has cost structure as

	To			**Availabilities**
	16	19	12	14
From	22	13	19	16
	14	28	8	12
Requirements	10	15	17	

6. A project has the following schedule:

Activity	**Duration (weeks)**	**Predecessors**
A	3	None
B	8	None
C	4	A, B
D	2	B
E	1	A
F	7	C
G	5	E, F
H	6	D, F
I	8	G, H
J	9	I

Construct the network and determine all the paths. Find the critical path and project duration.

7. Distinguish between PERT and CPM.

8. Using the principle of Dominance solve the following game

8	10	9	14
10	11	8	12
13	12	14	13

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Solve the following LPP using Simplex method

Max $z = 45x_1 + 80x_2$

Subject to $5x_1 + 20x_2 \leq 400$

$10x_1 + 15x_2 \leq 450$

$x_1, x_2 \geq 0$

Contd...

10. Solve the following unbalanced assignment problem of minimising total time for doing all the jobs.

Operator	**Job**				
	1	**2**	**3**	**4**	**5**
1	6	2	5	2	6
2	2	5	8	7	7
3	7	8	6	9	8
4	6	2	3	4	5
5	9	3	8	9	7
6	4	7	4	6	8

11. Solve the following transportation problem for minimum cost

Destinations	**Origins**				**Requirement**
	A	**B**	**C**	**D**	
1	7	4	3	4	15
2	3	2	7	5	25
3	4	4	3	7	20
4	9	7	5	3	40
Availability	12	8	35	25	100
					80

12. There are seven jobs, each of which has to go through the machines A and B is the order A-B. Processing time in hours are as follows:

Job	1	2	3	4	5	6	7
M_A	3	12	15	6	10	11	9
M_B	8	10	10	6	12	12	3

Determine the sequence of these jobs that will minimise the total elapsed time and find the idle time.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Consider the following project

Activity	**Time estimates in weeks**			
	$\mathbf{T}_O$	$\mathbf{T}_M$	$\mathbf{T}_P$	**Predecessors**
A	3	6	9	-
B	2	5	8	-
C	2	4	6	A
D	2	3	10	B
E	1	3	11	B
F	4	6	8	C, D
G	1	5	15	E

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