MAY 2022 **U/ID 46515/UCC5C**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What are the objectives of Operation Research?
2. What is the test of optimality in the simplex method?
3. What is Feasible solution?
4. What is Duality problem?
5. What is Transportation problem?
6. What is Assignment problem?
7. What is PERT?
8. What is variation of Assignment problem?
9. What is Monate Carlo method?
10. What is sequencing problem?
11. What is game theory?
12. Define simulation.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Write the scope of Operation Research.
14. Write the properties of Primal and Dual Optimal Solution.

15. Determine the initial basic feasible solution of the following transportation problem using Least Cost Method.

Factory	Distribution centres				Capacity (units)
	BANGALORE	MUMBAI	DELHI	CHENNAI	
AHEMEDABAD	6	8	8	5	30
ERNAKULAM	5	11	9	7	40
HYDERABAD	8	9	7	13	50
DEMAND (UNITS / DAY)	35	28	32	25	123

Costs are expressed in terms of rupees per unit shipped (for example) Ernakulam factory can ship one unit of the product of Delhi for Rs. 9). The problem is determine how much quantity should be shipped from the factory of various distribution centres.

16. Solve the following Assignment Problem :

Machines	Job			
	A	B	C	D
I	23	20	21	24
II	19	21	20	20
III	20	18	24	22
IV	22	18	21	23

17. Four Jobs can be processed on four different machines. One job on one machines. Resulting times in minutes vary with Assignments. They are given below.

		Machines			
		A	B	C	D
Jobs	I	42	35	28	21
	II	30	25	20	15
	III	30	25	20	15
	IV	24	20	16	12

Find the Optimum Assignment of jobs to machines and the corresponding profit.

18. Draw a network for the following project.

	Predecessor	A	B	C	D	E	F	G	H	J	K
Activity	Successor	–	C,D	G,E,F	G	F	J	H	J	K	–

19. Write about characteristics of Game Theory.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. Solve the following problem by Simplex Method.
Minimize $z = 3x + 25y$
subject to constraints
$2x + 4y \geq 40$
$3x + 2y \geq 50$
and $x, y \geq 0$

21. Solve the transportation problem for the minimum cost.

					Available
Demand	6	1	9	3	70
	11	5	2	8	55
	10	12	4	7	90
	85	35	50	45	

22. Find the critical path and the duration of the project.

Activity :	A	B	C	D	E	F	G	H	I	J
Predecessor :	–	–	A	B	C,D	C,D	E	E	F,G	H,J
Duration (Days) :	4	6	9	7	5	4	3	6	9	4

23. Find the optimal solution to the following transportation problem in which the cells contain the transportation cost in Rupees.

	W_1	W_2	W_3	W_4	W_5	Available
F_1	7	6	4	5	9	40
F_2	8	5	6	7	8	30
F_3	6	8	9	6	5	20
F_4	5	7	7	8	6	10
Required	30	30	15	20	5	100

24. Solve the game whose pay-off matrix is given by.

	Player B			
Player A	1	7	3	4
	5	6	4	5
	7	2	0	3