# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

### **U.G.** DEGREE EXAMINATION – **ELECTIVE**

### FOURTH SEMESTER - APRIL 2023

## 16 17 18UEC4ES01 / UEC 4602 - OPERATIONS RESEARCH

Date: 06-05-2023	Dept. No.	Max.: 100 Marks

## Time: 09:00 AM - 12:00 NOON

#### **PART-A**

## Answer any FIVE questions in about 75 words each.

 $(5\times4=20 \text{ Marks})$ 

- 1. Describe the various objectives of operation research.
- 2. State the meaning of linear programming.
- 3. Define transportation problem.
- 4. List out the assumptions of sequencing.
- 5. Bring out the optimality criterion of assignment problem.
- 6. Explain the term PERT.
- 7. Classify the various types of inventories.

#### **PART-B**

## Answer any FOUR questions in about 250 words each.

(4×10=40 Marks)

- 8. Explain the essential characteristics of a linear programming model.
- 9. Illustrate the simplex method of solving linear programming problem.
- 10. Solve the transport problem using least cost method.

Plants		Supply			
	2	3	11	7	6
	1	0	6	1	1
	5	8	15	9	10
Demand	7	5	3	2	T=17

11. Solve the sequencing model then find total elapsed time and idle time of both the machines.

Job	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

12. A company has a team of four salesman and there are four districts where the company wants to start its business. After considering the capabilities of salesman and the nature of districts, the company estimates that the profit per day in rupees for each salesman in each district is as below (Maximisation problem)

		Districts							
		1	2	3	4				
	Α	16	10	14	11				
Salesman	В	14	11	15	15				
	С	15	15	13	12				
	D	13	12	14	15				

13. Apply Hurwicz and Laplace Criterion to solve this decision-making problem

	State of nature (product demand)							
Alternatives	High	Moderate	Low	Nil				
	Rs.	Rs.	Rs.	Rs.				
Expand	50,000	25,000	-25,000	-45,000				
construct	70,000	30,000	-40,000	-80,000				
subcontract	30,000	15,000	-1,000	-10000				

14. Analyse the benefits of holding inventories.

#### **PART-C**

## Answer any TWO questions in about 900 words each.

(2X20=40 Marks)

15. Find optimum solution for the following transportation problem where all the entries are unit costs.

	D1	D2	D3	D4	D5	AVAILABLE
	68	35	4	74	15	18
REQUIRED	57	88	91	3	8	17
	91	60	75	45	60	19
	52	53	24	7	82	13
	51	18	82	13	7	15
	16	18	20	14	14	82/82

16. Explain the steps involved in Hungarian methods to solve an assignment problem.

17. A small maintenance project consist of the following 10 Jobs

Jobs	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration	2	8	10	6	3	3	7	5	2	8
Days										

Draw the network of the project. Summaries CPM calculations in a tabular form, calculating the three types of floats and hence determine the critical path.

18. Explain the various techniques of inventory management.

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