University of Kerala

U9360

Second Semester FYUGP Degree Examination, April 2025

Multi-Disciplinary course

MATHEMATICS

UK2MDCMAT102 - Basic Operations Research

Academic Level: 100-199

Time: 1 Hour 30 Minutes(90 Mins.)　　　　　　　　　　　　　　　　**Max. Marks: 42**

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

Qn No.	Question	CL	CO
1	Name any one method used to find initial feasible solution for transportation problem.	RE	2
2	Define a feasible solution of an LPP.	RE	2
3	Hungarian Method was discovered by ------------------	UN	3
4	Expand LPP	UN	2
5	Give an example of an unbalanced Transportation Problem.	UN	3
6	The solution to a transportation problem with m rows (supplies) and n columns(destinations) is feasible if number of positive allocations are………	UN	3

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Show the feasible region of the following LPP. Max $Z = 2x_1 + 3x_2$ Subject to $x_1 + x_2 \leq 1$, $3x_1 + x_2 \leq 4$ $x_1 \geq 0$, $x_2 \geq 0$.	UN	2
8	Distinguish between transportation and assignment problems.	UN	3
9	Solve the following assignment problem. 　　　　A　　　B　　　C　　　D 　1　120　　100　　80　　90 　2　　80　　90　　110　　70 　3　110　　140　　120　　100 　4　　90　　90　　80　　90	AP	4
10	Construct general mathematical model of LPP	AP	2

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A)	AP	2, 2

Qn No.	Question	CL	CO
	11.A)Solve the following LP graphically A. Min $Z = -x_1 + 2x_2$ Subject to the constraints: $x_1 + 3x_2 \leq 10$, $x_1 + x_2 \leq 6$, $x_1 - x_2 \leq 2$, $x_1 \geq 0$, $x_2 \geq 0$. OR B) .A company manufactures two products A and B. The resources are the capacities machine 1, machine 2, and machine 3. The available capacities are 50, 25 and 15hrs respectively. Product A requires 1hr of machine 2 and 1hr of machine 3. Product B requires 2hrs of machine 1, 2hrs of machine 2 and 1hr of machine 3. The profit contribution of products A and B are Rs5 and Rs4 respectively. Formulate the LPP model. Solve the following LPP graphically.		
12	A) Briefly explain the methodology of operation Research? Also, write a short note on the applications of operation research. OR B) Explain with an example for solving a transportation problem using North West Corner Rule	AN	1, 3
13	A) Briefly explain an Assignment Problem. Discuss one method for solving an assignment problem. Illustrate. OR B) Obtain an initial basic feasible solution to the following transportation problem: 		D1	D2	D3	D4	Supply
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O1	11	13	17	14	250
O2	16	18	14	10	300
O3	21	24	13	10	400
Demand	200	225	275	250			EV	3, 3
14	A) A manufacturer of furniture makes two products-chairs and tables. Processing of these products is done on two machines A and B.A chair requires 3 hours on machine A and 6 hours on machine B.A table requires 5 hours on machine A and 3 hours on machine B.Machine A is available 16	CR	2, 2

Qn No.	Question	CL	CO
	hours and whereas machine B is available for 30 hours during a week. A chair contributes Rs.2 towards profit and a table Rs.10.Formulate the problem as an LPP. OR B) Find the optimal solution to the following LPP Max $Z = 30x + 20y$ Subject to the conditions $3x + y \leq 1500$; $x + y \leq 3000$; $x, y \geq 0$.		