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ACCREDITED WITH A+ GRADE BY NAAC
CELEBRATING 25 YEARS

Internal Assesment Test - I

Sub:	OPERATIONS RESEARCH						Code:	20MBA24
Date:	28-07-2022	Duration:	90 mins	Max Marks:	50	Sem: II	Branch:	MBA

		Marks	OBE	
			CO	RBT
	Part A - Answer Any Two Full Questions (2* 20 = 40 marks)			
1 (a)	Define the term Operations Research.	[03]	CO1	L1
(b)	Explain the scope of Operations Research.	[07]	CO1	L2
(c)	Examine about the Linear Programming Problem in making managerial decision.	[10]	CO2	L3
2 (a)	Describe the term Feasible Solution.	[03]	CO2	L2
(b)	Illustrate the following LP problem using Graphical method. Maximize $Z = 6X_1 + 8X_2$ Subject to $5X_1 + 10X_2 \leq 60$ $4X_1 + 4X_2 \leq 40$ X_1 and $X_2 \geq 0$	[07]	CO2	L3
(c)	Outline the Equations based on the below case. A firm is engaged in producing two products A and B. each unit of product A requires 2 Kg of raw materials and 4 labour hours for processing, whereas each unit of product B requires 3 kg of raw material and 3 hours of labour or the same type. Every week, the firm has an availability of 60 Kg of raw material and 96 labour hours. One unit of product A sold yields Rs. 40 and one unit of product B sold gives Rs. 35 as profit. Formulate this problem as a linear programming problem to determine as to how many units of each of the products should be produced per week so that the firm can earn the maximum profit. Assume that there is no marketing constraints so that all that is produced can be sold.	[10]	CO2	L4
3 (a)	Define the term Unbounded Solution.	[03]	CO2	L1
(b)	Examine the LP problem using Graphical method. Minimize $Z = 2X_1 + 3X_2$ Subject to $X_1 + X_2 \geq 6$ $7X_1 + X_2 \geq 14$ X_1 and $X_2 \geq 0$	[07]	CO2	L2
(c)	Discuss the below case and formulate the LPP equations for the same. The Agriculture Research Institute suggested to a farmer to spread out atleast 4,800 Kg of a special phosphate fertilizers and not less than 7,200 Kg of a special Nitrogen fertilizers to raise the productivity of crops in his fields. There are two sources for obtaining these – mixtures A and B. Both of these are available in bags weighting 100	[10]	CO2	L2

kg each and they cost Rs. 40 and Rs. 24 respectively. Mixture A contains phosphate and nitrogen equivalent of 20 Kg and 80 Kg respectively. While Mixture B contains these ingredients equivalent of 50 Kg each.

Write this as a linear programming problem to determine how many bags of each type the farmer should buy in order to obtain the required fertilizers at minimum cost.

Part B - Compulsory (01*10=10 marks)

4	**Case Study**			
	Analyze the case given below. A company makes two kinds of leather belts. Belt A is a high quality belt, and belt B is of lower quality. The respective profits are Re. 0.40 and Re. 0.30 per belt. Each belt of type A requires twice as much time as a belt of type B, and if all belts were of type b, the company could make 1,000 per day. The supply of leather is sufficient for only 800 belts per day (both A and B combined). Belt A requires a fancy buckle, and only 400 per day are available. There are only 700 buckles a day available for belt B. What should be the daily production of each type of belt? Formulate the linear programming problem.	[10]	CO2	L4

	Course Outcomes (COs)	PO1	PO2	PO3	PO4	PO5
CO1:	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases.	1a, 1b				
CO2:	Use appropriate quantitative techniques to get feasible and optimal solutions.	2a, 2b, 2c, 3a, 3b, 4		1c, 3c		
CO3:	Understand the usage of game theory, Queuing Theory and Simulation for Solving Business Problems.	,				
CO4:	Understand and apply the network diagram for project completion.					

Cognitive level	KEYWORDS
L1 - Remember	list, define, tell, describe, recite, recall, identify, show, label, tabulate, quote, name, who, when, where, etc.
L2 - Understand	describe, explain, paraphrase, restate, associate, contrast, summarize, differentiate interpret, discuss
L3 - Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, experiment, show, examine, modify
L4 - Analyze	classify, outline, break down, categorize, analyze, diagram, illustrate, infer, select
L5 - Evaluate	asses, decide, choose, rank, grade, test, measure, defend, recommend, convince, select, judge, support, conclude, argue, justify, compare, summarize, evaluate
L6 - Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop, integrate

PO1–*Theoretical Knowledge; PO2–Effective Communication Skills; PO3–Leadership Qualities; PO4 –Sustained Research Orientation; PO5 –Self-Sustaining Entrepreneurship*

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Scheme of Evaluation
Internal Assessment Test 1– Aug 2022

Sub:	OPERATIONS RESEARCH					Code:	20MBA24
Date: 02-08-22	Duration: 90mins	Max Marks: 50	Sem:	IV	Branch:		MBA

Note: Part A - Answer Any Two Full Questions (20*02=40 Marks)

Part B - Compulsory (01*10= 10marks)

Part	Question #		Description	Marks Distribution	Max Marks
A	1	a)	Definition of Operations Research	3	20 M
		b)	Scope of Operations research Mentioning only the Points Explaining the points with examples.	3 4	
		c)	Linear Programming Problem in making Managerial Decision Mentioning only the Points Explaining the points with examples.	4 6	
	2	a)	Feasible Solution Meaning of Feasible Solution	3	20 M
		b)	Graph Points Calculation Graph Plotting and identifying the region Computation of Max. Z, X1 and X2.	2 2 3	
		c)	Identifying the Variables Writing the Constraints Writing the Objectivity, Constraints and Non Negativity.	3 3 4	
	3	a)	Definition of Unbounded Solution	3	20 M
		b)	Graph Points Calculation Graph Plotting and identifying the region Computation of Min. Z, X1 and X2.	2 2 3	
		c)	Identifying the Variables Writing the Constraints Writing the Objectivity, Constraints and Non Negativity.	3 3 4	
B	4		Identifying the Variables Writing the Constraints Writing the Objectivity, Constraints and Non Negativity.	3 3 4	10 M

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Internal Assesment Test – I

Sub:	OPERATIONS RESEARCH					Code:	20MBA24	
Date:	02-08-2022	Duration:	90 mins	Max Marks:	50	Sem:	I	Branch: MBA

SOLUTION

		Marks	OBE	
			CO	RBT
	Part A - Answer Any Two Full Questions (2* 20 = 40 marks)			
1 (a)	Definition of Operations Research Operations research is the application of the methods of science to complex problems in the of men, machines, materials and money in industry, direction and management of large systems business, government and defence.	[03]	CO1	L1
(b)	Scope of Operations research • Used by statisticians, administrators, politicians, and the technicians working in team to solve the problem • In agriculture-optimum allocation of land and water from the available resources • In finance-to maximize per capita income with min resources, profitable planning for the country, to determine the best replacement policies • In industry-optimum allocation of resources like 4m • In marketing-to decide the products for sale in which place ,to select the best advertising, what to purchase and when and from whom • In personnel management-to appoint most suitable person on minimum salary, to determine the base age for retirement • In production management-to find out number and size of the items to be produced, in scheduling and sequencing, to select, locate, and design the sites for production • In LIC-to decide the premium rates, to distribute the profits among the polices.	[07]	CO1	L2
(c)	Linear Programming Problem in making Managerial Decision ✓ Decisions under certainty or under uncertainty. ✓ Decisions for one time period only (Static) and Decisions made over several time periods (Dynamic) ✓ Decisions where the opponent is nature (Digging an oil), rational opponent (Competitors move)	[10]	CO2	L3

2 (a)	Describe the term Feasible Solution	[03]	CO2	L2
	The collection of all feasible solution is known as a feasible region.			
(b)	Max Z (Optimal) = 64 X1 = 8 X2 = 2	[07]	CO2	L3
(c)	Max. Z = 40X1 + 35X2 Subject to Constraints: $2X1 + 3X2 \leq 60$ {Raw Material Constraint} $4X1 + 3X2 \leq 96$ {Labour Hours Constraint} Non-Negativity Function $X1, X2 \geq 0$	[10]	CO2	L4
3 (a)	Define the term Unbounded Solution An unbounded solution of a linear programming problem is a solution whose objective function is infinite. A linear programming problem is said to have unbounded solution if its solution can be made infinitely large without violating any of the constraints in the problem. Since there is no real applied problem which has infinite returns, hence an unbounded solution always represents a problem that has been incorrectly formulated.	[03]	CO2	L1
(b)	Min Z (Optimal) = 12 X1 = 6 X2 = 0	[07]	CO2	L2
(c)	Min. Z = 40X1 + 24X2 Subject to Constraints: $20X1 + 50X2 \geq 4,800$ {Phosphate Fertilizers Requirements Constraint} $80X1 + 50X2 \geq 7,200$ {Nitrogen Fertilizers Requirements Constraint} Non-Negativity Function $X1, X2 \geq 0$	[10]	CO2	L2
	Part B - Compulsory (01*10=10 marks)			
4	Max. Z = 0.40X1 + 0.30X2 Subject to Constraints:		CO2	L4

$2X1 + X2 \leq 1000$

$X1 + X2 \leq 800$

$X1 \leq 400$

$X2 \leq 700$

Non-Negativity Function

$X1, X2 \geq 0$

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5
CO1:	Gain conceptual knowledge and practical experience in understanding the HR concepts globally.	1.a, 1.b				
CO2:	Comprehend and correlate the strategic approaches to HR aspects amongst PCN's, TCN's and HCN's.	2a, 2b, 2c, 3a, 3b, 4	1c, 3c			
CO3:	Develop knowledge and apply the concepts of HR in global perspective.					
CO4:	Have a better insight of HR concepts, policies and practices by critically analyzing the impact of contemporary issues globally.					

Cognitive level	KEYWORDS
L1 - Remember	list, define, tell, describe, recite, recall, identify, show, label, tabulate, quote, name, who, when, where, etc.
L2 - Understand	describe, explain, paraphrase, restate, associate, contrast, summarize, differentiate interpret, discuss
L3 - Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, experiment, show, examine, modify
L4 - Analyze	classify, outline, break down, categorize, analyze, diagram, illustrate, infer, select
L5 - Evaluate	asses, decide, choose, rank, grade, test, measure, defend, recommend, convince, select, judge, support, conclude, argue, justify, compare, summarize, evaluate
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PO1–*Theoretical Knowledge;* PO2–*Effective Communication Skills;* PO3–*Leadership Qualities;* PO4 –*Sustained Research Orientation;* PO5 –*Self-Sustaining Entrepreneurship*

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