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SARDAR PATEL UNIVERSITY
F.Y. B.B.A. (ISM) (IInd SEMESTER) (CBCS) EXAMINATION
2011
Tuesday, 26th April
4.00 p.m. to 6.00 p.m.
UM02EBBS01 : QUANTITATIVE TECHNIQUES

Total Marks: 60

Note : Graph papers & Log table will be provided on request.

Q.1
(a) Write Assumptions of Linear Programming. (05)

(b) Solve the given LPP by Graphical Method. (05)

$$\max z = 3x_1 + 5x_2$$
$$\text{sub to } 3x_1 + 2x_2 \leq 18$$
$$x_1 \leq 4$$
$$x_2 \leq 6$$
$$\text{where } x_1, x_2 \geq 0$$

(c) Solve the given LPP by Simplex Method (05)

$$\max z = x_1 - x_2 + 3x_3$$
$$\text{sub to } x_1 + x_2 + x_3 \leq 10$$
$$2x_1 - x_3 \leq 2$$
$$2x_1 - 2x_2 + 3x_3 \leq 0$$
$$\text{where } x_1, x_2, x_3 \geq 0$$

OR

Q.1
(a) Write limitations of Linear Programming. (05)

(b) Solve the given LPP by Graphical Method. (05)

$$\min z = 10x + 5y$$
$$\text{sub to } 3x + 5y \leq 150$$
$$5x + 4y \geq 100$$
$$0 \leq x \leq 30$$
$$0 \leq y \leq 15$$

(c) Solve the given LPP by simplex method (05)

$$\max z = 3x_1 + 2x_2$$
$$\text{sub to } x_1 + x_2 \leq 4$$
$$x_1 - x_2 \leq 2$$
$$\text{where } x_1, x_2 \geq 0$$

Q.2

(a) Determine initial basic feasible solution to the following transportation problem using the N-W corner Rule. (05)

		To			
		D_1	D_2	D_3	Available
From	O_1	50	30	220	1
	O_2	90	45	170	3
	O_3	250	200	50	4
Required		4	2	2	8

(b) A marketing manager has 5 salesmen and 5 sales districts. (05)
Considering the capacities of the salesmen and the nature of the district, the manager estimates that sales per month (in hundred rupees) for each salesmen would be as follows :

		Salesmen				
		A	B	C	D	E
Districts	1	32	38	40	28	40
	2	40	24	28	21	36
	3	41	27	33	30	37
	4	22	38	41	36	36
	5	29	33	40	35	39

Find the assignment of salesmen to districts that will result in maximum sales.

(c) A Company has three plants A, B and C and three ware houses X, Y and Z. Number of units available at three plants are 50, 70 and 80 respectively. Demands at X, Y and Z are 50, 80 and 80 respectively. Cost of transportation per unit is as follows : (05)

	X	Y	Z
A	8	7	3
B	3	8	9
C	11	3	5

Obtain total transportation cost using Least Cost Method for initial basic feasible solution.

OR

Q.2

(a) Obtain transportation cost for given T. P. using Matrix Minima Method. (05)

	D_1	D_2	D_3	D_4	Available
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Required	6	10	15	4	35

(b) Obtain initial basic feasible solution to the given T. P. using VAM. (05)

		Ware houses				
		W_1	W_2	W_3	W_4	Capacity
Factory	F_1	19	30	50	10	7
	F_2	70	30	40	60	9
	F_3	40	8	70	20	18
Requirement		5	8	7	14	34

(c) Consider the problem of assigning 5 jobs to 5 persons. The assignment costs are given as follows: (05)

		Jobs				
		I	II	III	IV	V
Persons	A	8	4	2	6	7
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

Determine the optimal assignment schedule.

Q.3

(a) Explain different types of game. (05)

(b) Using dominance rule, find the optimal strategies for A and B in the following game. Also obtain the value of game. (05)

		b_1	b_2	b_3	← B's strategy
A's Strategy	a_1	9	8	-7	
	a_2	3	-6	4	
	a_3	6	7	-7	

(c) Solve the following game using Graphical approach: (05)

		B's Strategy			
		b_1	b_2	b_3	b_4
A's Strategy	a_1	8	5	-7	9
	a_2	-6	6	4	-2

OR

Q.3

(a) What are the limitations of Game theory? (05)

(b) Solve the following game using Domenance Rule: (05)

		B's Strategy		
		b_1	b_2	b_3
A's Strategy	a_1	12	-8	-2
	a_2	6	7	3
	a_3	-10	-6	2

(c) Solve the following game using Graphical method: (05)

		B's Strategy	
		b_1	b_2
A's Strategy	a_1	-7	6
	a_2	7	-4
	a_3	-4	-2
	a_4	8	-6

Q.4

(a) Discuss the Assignable Causes of Variation. (05)

(b) Compute Control Limits for Variable Charts. (05)

Sample No.	1	2	3	4	5	6	7	8	9	10
$\overline{X}$	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
R	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.0

(for n=5, A_2=0.577, D_3=0, D_4=2.115)

(c) The number of defects noticed in 20 cloth pieces are given below: (05)
1, 4, 3, 2, 5, 4, 6, 7, 2, 3, 2, 5, 7, 6, 4, 5, 2, 1, 3, 8
Decide whether the process is in a state of statistical control or not

OR

Q.4

(a) Differentiate between Variable Charts and Attribute Charts. (05)

(b) (1) If for C-chart, CL = 16 then find UCL and LCL. (02)
(2) Write difference between p and np-chart. (03)

(c) Thirty samples, each of size 50 are taken from a production process. (05)
The number of defective articles in these samples are given below:
3, 2, 3, 0, 5, 10, 3, 3, 5, 6, 2, 3, 3, 2, 6
3, 5, 5, 0, 6, 5, 3, 9, 3, 1, 2, 2, 5, 4, 5
It is desired to keep the level of fraction defective at 0.05. Draw np-chart and state whether the desired standard is maintained or not.

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