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No. of printed page: 4

SARDAR PATEL UNIVERSITY
BBA (II Sem.) Examination
Wednesday, 26 February 2014
2.30 - 4.30 pm
UM02CBBS07 - Quantitative Techniques

Total Marks: 60

Note : (1) Figures to the right indicate full marks.
(2) Log table and graph paper will be provided on request.

Q.1

(a) Derive mathematical form of a general linear programming problem. **05**

(b) Solve the following linear programming problem by using simplex method. **05**

Maximise $Z = 3X_1 + 2X_2$
Subject to $2X_1 + X_2 \leq 10$
$X_1 + 3X_2 \leq 6$
$X_1, X_2 \geq 0$

(c) Solve the following linear programming problem by using graphical method. **05**

Minimise $Z = x + y$
Subject to $5x + 10y \leq 50$
$x + y \geq 2$
$y \leq 4$
$x, y \geq 0$

OR

Q.1

(a) Define following terms: **04**

I Feasible solution.
II Constraints.
III Objective function.
IV Slack variable.

(b) Solve the following linear programming problem by using graphical method. **05**

Maximise $Z = 5x + 7y$
Subject to $4x + 5y \leq 200$
$3x + 5y \leq 180$
$x, y \geq 0$

(c) Solve the following linear programming problem by using simplex method. **06**

Maximise $Z = 5X_1 + 7X_2$
Subject to $4X_1 + 5X_2 \leq 200$
$3X_1 + 5X_2 \leq 180$
$2X_1 + 3X_2 \leq 165$
$X_1, X_2 \geq 0$

Q.2

(a) What is Transportation Problem ? Also derive the mathematical formulation of Transportation Problem. **05**

(b) Solve the following minimal assignment problem. **05**

		Job				
		1	2	3	4	5
Man	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

(c) Solve the following Transportation Problem Matrix Minima method. **05**

	D_1	D_2	D_3	D_4	Supply
O_1	42	48	38	37	140
O_2	40	49	52	51	130
O_3	39	38	40	43	170
Demand	80	90	110	160	

OR

Q.2

(a) Solve the following Transportation Problem by VAM method. **05**

	I	II	III	IV	a_j
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
b_J	200	225	275	250	

(b) Solve the following Transportation Problem by North West corner method. **05**

	D_1	D_2	D_3	D_4	D_5	Supply
O_1	4	5	7	9	10	20
O_2	3	1	2	6	9	30
O_3	8	12	15	30	4	17
O_4	3	2	10	13	17	13
Demand	40	8	7	19	6	80

(c) Solve the following minimal assignment problem. **05**

		Job				
		1	2	3	4	5
Man	A	7	9	3	3	2
	B	6	1	6	6	5
	C	3	4	9	10	7
	D	1	5	2	2	4
	E	6	6	9	4	2

Q.3

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

(b) Solve the following game using Graphical method. **05**

		Player B			
		I	II	III	IV
Player A	I	2	2	3	-1
	II	4	3	2	6

(c) Solve the following game using dominance principle. **05**

		Player B			
		I	II	III	IV
Player A	I	3	5	9	6
	II	5	6	7	8
	III	8	7	8	7
	IV	4	2	5	3

OR

Q.3

(a) Explain types of Game. **05**

(b) Solve the following game using dominance principle. **05**

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

(c) Solve the following game graphically whose payoff matrix for the Player A is **05**

		Player B	
		I	II
Player A	I	2	4
	II	2	3
	III	3	2
	IV	-2	6

Q.4

(a) Write a note on variations due to assignable causes. **05**

(b) Draw $\bar{X}$ and R charts for the following data and state your conclusions. **10**

Sample No.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	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

OR

Q.4

(a) Write the difference between Variable charts and Attribute charts. **05**

(b) The number of defects noticed in 20 clothes 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?

(c) Samples of 400 bottles were taken daily for 15 days from a pharmaceutical company. The number of defective seals in these bottles are given below . **05**
Draw P chart for the data .

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Defective seals	28	18	40	42	32	62	50	10	30	22	80	62	76	56	30

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