

**SVKM's NMIMS**  
**School of Distance Learning**

Programme: PGDSCM

Academic Year: 2010-2011

Subject: Decision Analysis and Modeling

Semester IV

Course New

Marks: 70

Date: 3.7.2011

Time: 3.00 pm to 6.00 pm

Q 1) Attempt any Two

[10]

- a) State benefits of Graphical Method. What are the limitations of graphical method.
- b) What is duality? Distinguish between primal and dual of Linear Programming Problem
- c) What is degeneracy in LP problems? When does it occur? How can degeneracy problem be solved?
- d) What is Monte Carlo Simulation. Explain.

Q 2) Attempt any Two

[10]

- a) Distinguish between Balanced Transportation Problem & Unbalanced Transportation Problem
- b) Discuss between individual and group decision making?
- c) Write short note on Techniques for improving Group decision making?
- d) Write short note on branch and bound method ?
- e) Explain Linear analysis & non-linear analysis in time series analysis.

Q 3) Attempt any Three

[30]

a) Solve by Graphical Method

$$\text{Maximise } Z = 30x_1 + 15x_2$$

$$\text{Subject to } x_1 + 1.5x_2 \leq 200$$

$$2x_1 + x_2 \leq 200$$

$$3x_1 \leq 200$$

$$x_1, x_2 \geq 0$$

- b) An investor is considering 3 options i) to open a retail shop (ii) to open a super market or (iii) not to open any shop at all. The market for the product the investor plans to sell can be good, average or bad. The probabilities of these 3 possibilities are 0.3 for a good market, 0.5 for an average market and 0.2 for a bad market. The payoffs for the 3 options are given below.

Decision Alternatives	Good Market (0.3)	Average Market (0.4)	Bad Market (0.2)
Small Retail Shop	60000	25000	-40000
Super Market	90000	35000	-50000
No Shop	0	0	0

What do you recommend to the Investor.

c) Determine the trend values of the following data by using 3-year moving average.

Year :	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Production ('000 tonnes)	26	27	30	28	27	29	30	32	31	31

d) What is dominance? Solve the game given below after using dominance

1	7	2
6	2	7
5	1	6

Also find value of game.

e) What is Minimum Spanning Tree? Write Prim's Algorithm for minimum spanning tree.

Q 4) Attempt any two

I) A cement factory manager is considering the best way to transport cement from his three manufacturing centres P, Q, R to depots A, B, C, D & E. the weekly production and demands alongwith transportation costs per ton are given below. What should be the distribution programme to minimize the transportation cost.

- Is the solution feasible?
- Is there any alternate Solution?
- Is the solution optimal?
- What is the minimum transportation cost?

	A	B	C	D	E	Demand
P	4	1	3	4	4	60
Q	2	3	2	2	3	35
R	3	5	2	4	4	40
Supply	22	45	20	18	30	135

II) Find the dual of the given LP problem and hence solve the dual by simplex method

$$\text{Minimise } Z = 6x_1 + 5x_2$$

$$\text{Subject to } 4x_1 + 8x_2 \geq 80$$

$$6x_1 + 4x_2 \geq 100$$

$$5x_1 + 5x_2 \geq 95$$

$$6x_1 + 3x_2 \geq 110$$

$$x_1, x_2 \geq 0$$

(2)

III) A construction company has developed a pay off table for the three alternative decisions which it is considering taking into consideration three estimates for the demand for house construction, The pay off table is given below.

Decision Alternative	States of Nature		
	Low	Moderate	High
Hire own employees	Rs 250000	Rs 100000	Rs 625000
Sub-contract	Rs 100000	Rs 150000	Rs 415000
Do Nothing	Rs 50000	Rs 80000	Rs 300000

Which alternative is best according to each of the following decision criteria?

- A) Maximin
- B) Maximax
- C) Savage Regret minimax
- D) Minimax
- E) Laplace

(3)