SVKM's NMIMS
NMIMS Global Access – School for Continuing Education

Programme: PGDSCM

June 2013 Examination
Subject: Decision Analysis and Modeling

Semester: IV
Course: New
Marks 70

Date:23.06.2013

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

1. **Answer to each new question to be started on a fresh page.**
2. **Figure in bracket indicates full marks.**

Q 1) Attempt any 2 out of 3 (Marks 10)

a) Explain different essential conditions of Linear Programming Model.

b) Explain Vroom and Yetton's Normative Model.

c) Describe the steps involved in Simplex Method for Minimization Problem.

Q 2) Attempt any 2 out of 5 (Marks 10)

a)Define Shortest Path in Minimum Spanning Tree. Explain Prim's Algorithm.

b) Explain the following in Transportation Problem

i) Degeneracy

ii) Vogel's Approximation Method

c) Explain Brain Stroming Process in Simulation.

d) Explain Pure Strategy and Mixed Strategy.

e) Explain decision making under Uncertainty.

Q 3) Attempt any 3 out of 5 (Marks 30)

a) Solve by Graphical Method
Maximise z= 40x + 30y
Subject to
$4x + 5y <= 175$
$2y <= 50$
$6x+3y<=150$
Where $x,y >= 0$

b) Solve the following transportation problem to have optimal solution.

	A	B	C	D	E	Supply
P	6	4	2	11	3	150
Q	4	3	6	6	4	250
R	10	8	3	2	8	100
S	15	11	8	9	10	70
Demand	100	200	120	80	70	

c) Solve the game given below and find the value of game.

$$\begin{pmatrix} 2 & 5 & 3 \\ 6 & 2 & 7 \\ 5 & 1 & 6 \end{pmatrix}$$

d) A company dealing with newly invented telephonic device is faced with the problem of selecting the following strategies-

1) Manufacture the device itself.
2) To be paid on a royalty basis by another manufacturer.
3) Sell the rights for its invention for a lump sum.

The profit in thousands of rupees that can be expected in each case and the probability associated with the sales volume are shown in the following table.

Event	Probability	Manufacture itself	Royalties	Sell the Rights
High Demand	0.3	100	40	20
Medium Demand	0.3	40	30	20
Low Demand	0.4	-10	15	20

i) Represent the company's problem in the firm of a decision tree.
ii) Extend the diagram further if the company manufactures itself and sales are medium or high, it has the opportunity of developing a new version of its telephone.

e) From the given data below
i) Find the two regression equations.
ii) Coefficient of correlation between marks in Economics & Statistics.
iii) Most likely marks in Statistics when the marks in Economics is 30.

(3)
(3)
(4)

Marks in Economics	36	28	35	32	36	36	29	38	34	32
Marks in Statistics	44	46	49	41	36	32	31	34	33	39

Q 4) Attempt any 2 out of 3. (Marks 20)

a) Solve by Simplex method.
Maximise z = 4x + 3y + 5z
Subject to
4x + 5y + 6z <= 175
2y + z <= 50
6X + 3y + 3z >= 150
Where x,y,z >= 0

b) Solve the below Transportation problem to Maximise the profit.

	1	2	3	4	5	6	Supply
A	65	50	77	51	65	51	200
B	60	51	65	52	64	76	225
C	70	62	21	71	45	52	125
Demand	45	55	40	60	25	175	

Solve by MMM and Vogel's Method and apply MODI's method to find optimal solution.

c) Fit a straight line from the following data

X	1	3	4	5	7	8	9	10	11
Y	1	4	5	6	8	9	7	7	6

Estimate the value of Y when X = 13.