

Total No. of Questions : 5]

PE-5830

SEAT No. :

LIBRARY

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[6551]-806

F.Y. M.B.A.

DS-506 MJ GC-06 : DECISION SCIENCE

(2024 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Each question carries 10 marks.
- 3) Each questions has internal options.
- 4) Use of simple calculator is allowed.
- 5) Graph paper will not be provided, draw graph on answer paper.

Q1) Solve any five questions :

[5 × 2 = 10]

- a) Write any two importance of decision science.
- b) List the methods of finding feasible solution of Transportation problem.
- c) Write two applications of Assignment Problem.
- d) List the elements of LPP formulation.
- e) Explain saddle point.
- f) Define Pure & Mixed strategy game.
- g) What is Network Analysis.
- h) Explain PERT & CPM.

Q2) Solve any two questions :

[2 × 5 = 10]

- a) Write short notes on Vogel's Approximation Method (VAM).
- b) Explain the characteristics and role of Quantitative techniques in decision making.
- c) Solve the following LPP

$$\text{Minimize } Z = 10x_1 + 7x_2$$

$$\text{Subject to } x_1 + 2x_2 \leq 4$$

$$x_1 + x_2 \geq 5$$

$$x_1, x_2 \geq 0$$

P.T.O.

- Q3) a)** Solve the following problem for maximizing the production output. The data refers to the production of an article for the given operators and machine are below : **[10]**

Operators	Machines			
	A	B	C	D
1	10	5	7	8
2	11	4	9	10
3	8	4	9	7
4	7	5	6	4
5	8	9	7	5

OR

- b)** Solve the following game, given the pay-off matrix as below : **[10]**

Player A	Player B	
	B1	B2
A1	1	7
A2	6	2

- Q4) a)** Obtain the Initial solution for the following Transportation problem by using : **[10]**

- i) Least Cost Method
ii) Vogel's Approximation Method

	1	2	3	Supply
X	10	3	9	400
Y	12	10	5	300
Z	8	11	12	300
Requirement	200	300	500	

OR

- b) Given the following pay-off matrix use i) maximax, ii) maximin and iii) Hurwicz criteria and find which action to be taken (Given : $\alpha = 0.7$)

[10]

States on Nature	Estimated Profit (in Rs.)			
	A1	A2	A3	A4
S1	10	5	8	6
S2	3	9	15	2
S3	-3	4	6	10

- Q5) a) A Project has been defined to contain the following list of activities along with their required time of completion.

[10]

Activity	A	B	C	D	E	F	G	H	I
Time (Days)	1	4	3	7	6	2	7	9	4
Immediate predecessor	-	A	A	A	B	C	E,F	D	G,H

- Draw the network diagram
- Determine critical path
- Show early start time and early finish time

OR

- b) Mr. Rao, the owner of a Readymade garments shop wishes to publish advertisements in two local daily newspapers, One Marathi and one English. The expected coverage through the advertisements is 1000 people and 1500 people per advertisement respectively. Each advertisement in a Marathi newspaper costs Rs. 3000 and for an English daily it is Rs. 5000. Mr. Rao has decided not to place more than 10 advertisements in the Marathi newspaper and wants to place at least 6 advertisements in the English daily. The total advertisement budget is Rs. 50000. Formulate the problem as a L.P. Model.

[10]



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M.B.A.

GC - 06 : DECISION SCIENCE
(2024 Pattern) (Semester - I) (DS - 506 MJ)

Time : 2½ Hours]

[Max. Marks : 50

Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Each question carries 10 marks.
- 3) Each question has an internal option.
- 4) Use of simple calculator is allowed.
- 5) Graph paper will not be provided separately, draw graph on answer paper.

Q1) Solve Any Five questions :

[10]

- a) Explain PERT.
- b) What is Saddle Point?
- c) What is Hungarian Method?
- d) What is Pure strategy Game?
- e) Explain Method to Obtain Feasible solution in Transportation Problem.
- f) What is Unbalanced Transportation Problem?
- g) Explain CPM
- h) What is EMV criteria in decision making under risk?

Q2) Solve Any Two out of the three questions :

[10]

- a) Explain role of quantitative techniques in management decision making process.
- b) With suitable example elaborate difference between CPM and PERT.
- c) How would you deal with assignment problems where:
 - i) Some Assignment are prohibited.
 - ii) The objective function is to be maximized.
 - iii) It is not balanced problem.
 - iv) It has got multiple solution

P.T.O.

Q3) Solve Any One :

[10]

- a) A project work consists of four major jobs for which an equal number of contractors have submitted tenders. The tender amount quoted (in lakhs of rupees) is given in the matrix:

	Job				
Contractor		a	b	c	d
	1	10	24	30	15
	2	16	22	28	12
	3	12	20	32	10
	4	9	26	34	16

Find the optimum assignment which minimises the total cost of the project.

OR

- b) Solve the following LPP graphically.

$$\text{Minimise } Z = 6x + 5y$$

$$\text{Subject to; } 4x + y \geq 10$$

$$2x + 3y \geq 15$$

$$x \leq 10$$

$$x, y \geq 0$$

Q4) Solve Any One :

[10]

- a) Two breakfast food manufacturing firms A and B are competing for an increased market share. To improve its market share, both the firms decide to launch the following strategies :

$$A_1 B_1 = \text{Give coupons, } A_2 B_2 = \text{Decrease Price}$$

$$A_3 B_3 = \text{Maintain Present Strategy } A_4 B_4 = \text{Increase Advertising}$$

The pay off matrix shown in the following table describes the increase in the market share for firm A and decrease in the market share for firm B.

Firm A	Firm B			
	B ₁	B ₂	B ₃	B ₄
A ₁	35	65	25	5
A ₂	30	20	15	0
A ₃	40	50	0	10
A ₄	55	60	10	15

Determine the optimal strategies for each firm and the value of the game.

OR

- b) Obtain the initial solution of the following transportation problem using
- NWCM
 - LCM
 - VAM

	D_1	D_2	D_3	D_4	Supply
O_1	10	20	5	7	10
O_2	13	9	12	8	20
O_3	4	15	7	9	30
O_4	14	7	1	0	40
O_5	3	12	5	19	50
Demand	60	60	20	10	

Q5) Solve Any One from the following :

[10]

- a) A project has been defined to contain the following list of activities along with their required time of completion.

Activity	A	B	C	D	E	F	G	H	I
Time in Days	1	4	3	7	6	2	7	9	4
Immediate Predecessor	-	A	A	A	B	C	E,F	D	G,H

- Draw the network diagram.
- Show early start time and early finish time.
- Identify critical path.
- What would happen if duration of activity F is taken as four days instead of two?

OR

- b) A farmer wants to decide which of the three crops he should plant. The farmer has categorised the amount of rainfall as high, medium and low. Estimated profit is given below:

Rainfall	Estimated profit (In Rs.)		
	Crop - A	Crop - B	Crop - C
High	8000	3500	5000
Medium	4500	4500	4900
Low	2000	5000	4000

Farmers wishes to plant one crop. Decide the best crop using :

- i) Hurwicz Criteria ($\alpha = 0.6$)
- ii) Laplace Criteria
- iii) Minimax Regret Criteria



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SEAT No. :

PC-3256

[Total No. of Pages : 3

[6380]-5006

M.B.A.

106 - GC - 06 : DECISION SCIENCE
(2024 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Each question carries 10 marks.*
- 3) *Each question has an internal option.*
- 4) *Use of simple calculator is allowed.*
- 5) *Graph paper will not be provided separately, draw graph on answer paper.*

Q1) Solve any five questions :

[10]

- a) What is CPM?
- b) Enlist various criteria of decision making under Risk.
- c) What is Mixed strategy Game?
- d) Explain Principal of Dominance.
- e) Enlist various criteria of decision making under Uncertainty.
- f) Explain the concept of PERT.
- g) What is Hungarian Method?
- h) Explain Methods to Obtain Feasible solution in Transportation Problem.

Q2) Solve any two out of the three questions :

[10]

- a) Explain importance of decision science in organizational decision making process.
- b) Explain applications of Linear programming in functional areas of management.
- c) Differentiate between PERT and CPM.

P.T.O.

Q3) Solve Any One :

[10]

- a) The owner of winner sports wishes to determine the number of advertisements to be placed in three selected monthly magazine A, B and C. His objective is to advertise in such a way that the total exposure to the principal buyers of the expensive sports goods is maximized. Percentage of readers for each magazine are known. Exposure in any particular magazine is the number of advertisements placed multiplied by number of principal buyers. The following data may be used:

Particulars	Magazines		
	A	B	C
Readers	100000	60000	40000
Principal Buyers	15%	15%	7%
Cost/Adv. (Rs.)	5000	4500	4250

The budget amount at most is Rs.100000 for advertisements. The owner has already decided that magazine A will have no more than 6 advertisements and that B and C each have at least 2 advertisements. Formulate LPP model for the given information.

OR

- b) The cost (Rs.Thousand) of locating of machines the places is estimated as follows. Find the optimal assignment schedule.

	Places				
	A	B	C	D	E
M ₁	19	21	25	20	21
M ₂	27	24	-	25	24
M ₃	-	24	27	24	20
M ₄	22	16	20	15	16

Q4) Solve Any One :

[10]

- a) Find the optimal strategies for A and B in the following game. Also obtain the value of the game.

Player A	Player B		
	B ₁	B ₂	B ₃
A ₁	9	8	-7
A ₂	3	-6	4
A ₃	6	7	-7

OR

- b) Pay-offs of three acts X, Y, Z and the states of nature of L, M, N are given below:

States of Nature	Acts		
	X	Y	Z
L	-20	-50	200
M	200	-100	50
N	400	600	300

The probabilities of the states of nature are 0.3, 0.4 and 0.3 respectively. Calculate VPI for the above data.

Q5) Solve any one from the following :

[10]

- a) Find the initial solution for the following problem by using
- NWCM
 - LCM
 - VAM

	W_1	W_2	W_3	W_4	Supply
P_1	190	300	500	100	70
P_2	700	300	400	600	90
P_3	400	100	400	200	180
Demand	50	80	70	140	

OR

- b) Following are the activities of a project:

Activity	Immediate Predecessor activity	Activity time in Weeks		
		Most Optimistic	Most Likely	Most Pessimistic
A	-	4	7	13
B	A	6	9	11
C	A	5	7	9
D	B	3	5	7
E	C	7	8	10
F	D	2	3	5
G	E	6	7	8
H	F & G	2	3	4

- Calculate the expected time of each activity.
- Draw the network diagram and indicate the expected time on each activity.
- Identify the critical path in the diagram.



