Hi-Tech Institute of Engineering & Technology

DEPARTMENT OF COMMERCE & MANAGEMENT
Course MBA
(SEM- 6th) EVEN SEMESTER MODEL PAPER 2022-23

Subject Code: KMBN-206 **Subject Name: Quantitative Techniques for Managers**
Faculty Name: Ms. Surbhi Agarwal

Time: 90 Minutes *Total Marks: 100*
Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION-A

1. Attempt all question in brief. 2x 10 = 20

Q.No	Question	Marks	CO
a.	What is its significance in Simplex method of solving LPP?	2	1
b.	Write the classification of OR models.	2	1
c.	Give the mathematical formulation of an assignment problem.	2	3
d.	Define a saddle point in a game.	2	4
e.	Explain phases of operations research.	2	1
f.	Explain the use of vogel's approximate method?	2	2
g.	State the characteristics of transportation problem.	2	2
h.	What is a rectangular game? Define pure strategy and mixed strategy in a game.	2	4
i.	What are the characteristics of game theory?	2	4
j.	What is present worth factor and state its importance in replacement?	2	5

SECTION-B

2. Attempt any Four of the following: 4x10 =40

Q.No	Question	Marks	CO
a.	Solve the following linear programming problem by simplex method? Maximize Z=5X$_1$+3X$_2$ subject to constraints 3X$_1$+5X$_2$ ≤ 15, 5X$_1$+2X$_2$ ≤ 10 and X$_1$, X$_2$ ≥ 0.	10	1
b.	Find an Optimal solution to following transportation problem:	10	2
c.	State different types of models used in operation research. Explain any two in detail.	10	1
d.	Use the graphical method for solving the following game and find the value of game?	10	4
e.	Expain Techniques of Operation Research & OR Models.	10	1

(Q2.b table)

Origin	Destination				Supply
	A	B	C	D	
X	2	2	2	1	30
Y	10	8	5	4	70
Z	7	6	6	8	50
Demand	40	30	40	40	

(Q2.d table)

	Player B			
	B1	B2	B3	B4
A1	2	2	3	-2
A2	4	3	2	6

SECTION-C

3. Attempt any ONE part of the following: 1x10 = 10

Q.No	Question	Marks	CO
a.	The Cost of a machine is Rs. 6100 & its scrap value is Rs. 100. The maintenance cost is found from experience to be: <table><tr><td>Year</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>maintenance cost</td><td>100</td><td>250</td><td>400</td><td>600</td><td>900</td><td>1200</td><td>1600</td><td>2000</td></tr></table>	10	5
b.	Solve the following LPP by dynamic programming: Minimize $Z = x_1 + 3x_2 + 4x_3$ Subject to $2x_1 + 4x_2 + 3x_3 \geq 60$, $3x_1 + x_2 + 3x_3 \geq 90$ $x_1, x_2, x_3 \geq 0$.	10	2

4. Attempt any ONE part of the following: 1x10 = 10

Q.No	Question	Marks	CO
a.	Give the generalized mathematical formulation of an assignment problem. Give a comparative study of transportation problem and assignment problem.	10	3
b.	Define PERT & CPM Technique of Project Management.	10	5

5. Attempt any ONE part of the following: 1x10 = 10

Q.No	Question	Marks	CO
a.	Solve the following problem by using Hungarian assignment problem? <table><tr><td></td><td>D1</td><td>D2</td><td>D3</td><td>D4</td><td>D5</td></tr><tr><td>O1</td><td>4</td><td>6</td><td>7</td><td>5</td><td>11</td></tr><tr><td>O2</td><td>7</td><td>3</td><td>6</td><td>9</td><td>5</td></tr><tr><td>O3</td><td>8</td><td>5</td><td>4</td><td>6</td><td>9</td></tr><tr><td>O4</td><td>9</td><td>12</td><td>7</td><td>11</td><td>10</td></tr><tr><td>O5</td><td>7</td><td>5</td><td>9</td><td>8</td><td>11</td></tr></table>	10	3
b.	Explain the theory of dominance in the solution of rectangular games with assumption of game theory.	10	3

6. Attempt any ONE part of the following: 1x10 = 10

Q.No	Question	Marks	CO
a.	In a factory, there are six jobs to process, each of which should go to machine A & machine B in order AB. The processing timings in minutes are given. Determine the optimal sequence & total elapsed time. <table><tr><td>Jobs</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Machine A</td><td>7</td><td>4</td><td>2</td><td>5</td><td>9</td><td>8</td></tr><tr><td>Machine B</td><td>3</td><td>8</td><td>6</td><td>6</td><td>4</td><td>1</td></tr></table>	10	4

b.	An Engineering company is offered a material handling equipment A. The machine A is priced at Rs.60, 000 including cost of installation. The costs for operation and maintenance are estimated to be Rs 10, 000 for each of the first five years, increasing every year by Rs 3,000 in the sixth and subsequent years. The company expects a return of 10% on all its investments. What is the optimal replacement period?	10	5