ADDITIONAL EXAM FOR SPORT STUDENTS
MASTER OF BUSINESS ADMINISTRATION (CBCS - 2020 COURSE)
M.B.A Sem-III : WINTER- 2022
SUBJECT : OPERATIONS RESEARCH FOR MANAGERS

Day : Thursday | Time : 10·00AM TO 12:00 NOO

Date : 19-01-2023 | **W-22790-2022** | Max. Marks : 50

N.B.:
1) Attempt Any Three Questions from Section – I. Each Question carries 10 marks.
2) Attempt Any Two Questions from Section – II. Each Question carries 10 marks.
3) Both the sections should be written in the Same answer book.
4) Use of non – programmable calculator is allowed.
5) Allowed to use graph paper wherever necessary.

Section – I

Q. 1

Find solution using graphical simplex method.

Maximize $Z = -2x1 - x2$

subject to the constraints
$-3x1 - x2 \leq -3$
$-4x1 - 3x2 \leq -6$
$-x1 - 2x2 \leq -3$

and $x1, x2 \geq 0$

Q. 2

Find an initial basic feasible solution for given transportation problem by using Vogel's approximation method

	D_1	D_2	D_3	D_4	Supply
S_1	7	8	4	5	5
S_2	8	10	2	3	7
S_3	7	6	17	8	8
S_4	19	10	11	3	10
Demand	10	5	10	5	

Q. 3

A department has five employees with five jobs to be performed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix.

		Employees				
		I	II	III	IV	V
Jobs	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

How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

Q. 4

A tyre shop keeps stock of particular brand of tyres. Previous experience indicates the daily demand as given below.

Demand/Day	0	10	20	30	40	50
Probability	0.01	0.15	0.20	0.50	0.12	0.02

Consider the following sequence of random numbers:
21,27,47,54,60,39,43,91,25,20
Using this sequence, simulate the demand for the next 10 days. Also estimate the average demand for the tyres on the basis of simulated data.

Q. 5 Write short Notes (Any Two)

a) Significance of Operations Research

b) Applications of Assignment Problems

c) Floats

Section – II

Q. 6

An industry is manufacturing two types of products A and B. The profits per Kg of the two products are Rs 30 and Rs 40 respectively. These two products require processing in three types of machines. The following table shows the available machine hours per day and the time

required on each machine to produce one Kg of A and B. Formulate the linear programming model

Profit/Kg	A	B	Total available Machine hours/day
Machine-1	3	2	600
Machine-2	3	5	800
Machine-3	5	6	1100

Q. 7

Four factories, A, B, C and D produce sugar and the capacity of each factory is given below: Factory A produces 10 tons of sugar and B produces 8 tons of sugar, C produces 5 tons of sugar and that of D is 6 tons of sugar. The sugar has demand in three markets X, Y and Z. The demand of market X is 7 tons, that of market Y is 12 tons and the demand of market Z is 4 tons. The following matrix gives the transportation cost of 1 ton of sugar from each factory to the destinations. Find the Optimal Solution for least cost transportation cost.

	X	Y	Z	Availability
A	4	3	2	10
B	5	6	1	8
C	6	4	3	5
D	3	5	4	6
Requirement	7	12	4	

Q.8

Draw the network diagram from the following activity and find the critical path and total duration of the project.

Activity	**Predecessor**	**Duration**
A	-	2
B	-	4
C	-	3
D	A	1
E	B	6
F	C	5
G	D,E	7
H	F,G	2

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