K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:I
Class:PG-I	Program:MBA
Branch Code:10	Pattern:2024
Name of Course:Decision Science	Course Code:2410506
Max. Marks:30	Duration:1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains Three page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.
6. Q No.1 and 3 are compulsory Solve a } or b} from Q . 2 and Q.4

		Marks	CO
Question No. 1			
1 a)	Write the formulation of linear programming.	(3)	CO2
1 b)	Explain the methodology for application of decision making in a given situation.	(4)	CO2
Question No. 2			
2 a)	Use the graphical method to solve the following LP problem. Minimize $Z = -X_1 + 2X_2$ subject to the constraints (i) $-X_1 + 3X_2 \leq 10$, (ii) $X_1 + X_2 \leq 6$, (iii) $X_1 - X_2 \leq 2$ and $X_1, X_2 \geq 0$.	(8)	CO2, CO3
	OR		
2 b)	ABC Company has been a producer of picture tubes for television sets and certain printed circuits for radios. The company has just expanded into full scale production and marketing of AM and AM-FM radios. It has built a new plant that can operate 48 hours per week. Production of an AM radio in the new plant will require 2 hours and production of an AM-FM radio will require 3 hours. Each AM radio will contribute Rs 40 to profits while an AM-FM radio will contribute Rs 80 to profits. The marketing department, after extensive research has determined that a maximum of 15 AM radios and 10 AM-FM radios can be sold each week a) Formulate a linear programming model to determine the optimum production mix of AM and FM radios that will maximize profits. (b) Solve this problem using the graphical method	(8)	CO2, CO3
Question No. 3			
3 a)	The school of International Studies for population' found out, through its survey, that the mobility of the population (in percent) of a state to village, town, and city is in the following percentages.	(3)	CO2, CO3

	To		
From	**Village**	**Town**	**City**
Village	50%	30%	20%
Town	10%	70%	20%
City	10%	40%	50%

What will be the proportion of population I village, town, and city after one year, given that the present population has proportions of 0.7, 0.2 and 0.1in the village, town and city, respectively.

3 b) The rainfall distribution in monsoon is as follows: (4) CO2, CO3

Rain in cm.	0	1	2	3	4	5
Frequency	50	25	15	5	3	2

Simulate the rainfall for 10 days using the following random numbers: 67, 63, 39, 55, 29, 78, 70, 06, 78, 76 and also find average rainfall.

Question No. 4

4 a) Following data table gives the time taken in hours by each worker undertaking different jobs (8) CO2, CO3

		WORKERS				
		W1	**W2**	**W3**	**W4**	**W5**
JOBS	**A**	12	15	13	14	15
	B	6	18	15	14	16
	C	18	16	15	18	20
	D	15	20	18	17	19
	E	16	15	18	14	15

Determine optimal assignments & calculate the total time for optimal assignment.

OR

4 b) A project work consists of four major jobs for which an equal number of contractors have submitted tenders. The tender amount quoted (in lakh of rupees) is given in the matrix. (8) CO2, CO3

	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 assignment which minimises the total cost of the project when each contractor has to be assigned at least one job.

····· End of question paper·····