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

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

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:PG-II	Program:MBA
Branch Code: 10	Pattern:2022/24
Name of Course:Decision Science	Course Code:MBA223002
Max. Marks:60	Duration:2.30 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 5 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. Q1 and Q2 are compulsory. Solve any one from a or b and c or d for Q3 to Q5.

Marks CO

Question No. 1

1a) Find our rank correlation for below problem. (6) CO1

Sr No	Stats Marks	Maths Marks
1	35	45
2	32	33
3	30	27
4	26	26
5	37	40
6	28	20
7	46	49
8	44	35

Question No. 2

2a) Solve below LPP problem by graphical method. (6) CO2

Max Z = 5x + 3y

With respect to constraints,

$2x + y \leq 18$

$X + 2y \leq 16$

$x, y \geq 0$

Question No. 3

3a) Solve below transportation problem. Use VAM method to find initial solution and MODI method for optimised solution. (8) CO3

	D1	D2	D3	D4	Supply
S1	5	6	5	8	15
S2	8	8	6	9	25
S3	7	7	5	8	20
S4	8	9	7	10	10
Demand	10	20	25	15	

OR

3b) Solve below transportation problem. Use North West Corner Rule method to find initial solution and MODI method for optimised solution. (8) CO3

	D1	D2	D3	Supply
S1	6	4	7	20
S2	5	6	8	25
S3	9	7	3	15
Demand	10	30	20	

3c) The personal manager of ABC company wants to assign Mr. X, Y, Z to the regional office for which cost is given below. (8) CO3

Find out the optimum cost of assignment problem.

Office Mr.	D	M	K	C
X	1600	2000	2400	2000
Y	1000	3200	2600	1600
Z	1000	2000	4600	3000

OR

3d) There are 5 jobs to be performed but only 4 operators are available. Table below gives the time required to perform the job. Assign operators to complete the tasks so that time required to complete the Task is minimum. (8) CO3

	Jobs

Operator	A	B	C	D	E
X	27	18	-	20	21
Y	31	24	21	12	17
Z	20	17	20	-	16
W	20	28	20	16	27

Question No. 4

4a) The three estimates of time in weeks for activities of a project are given below: (8) CO4

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Pessimistic Time	7	7	12	15	1	8	7
Most Likely Time	6	1	4	6	1	2	4
Optimistic Time	5	1	2	3	1	2	1

Draw network diagram. Find out Critical path & Project duration. Estimate expected Standard deviation of critical path.

OR

4b) Draw network diagram for below table and find out the critical path by using forward and backward method and find out the project completion time. (8) CO4

Activity	Task	Predecessor	Time
A	Dismantle pipe	-	10
B	Dismantle heater	A	8
C	Remove tube bundle	B	7
D	Clean bolts	B	4
E	Clean heater	B	12
F	Clean tube	C	7
G	Clean shell	C	8
H	Replace tube	F,G	4
I	Replace heater	D,E,H	6
J	Replace bolt	I	3

4c) For a particular system arrival rate of customer is 20 per hour and manager can give the service 30 customers per hour. Using queuing theory formulas find out below things. (8) CO4

1) Probability that manager is busy

2) Probability that manager is sitting idle

3) Average waiting time of the customer in the queue

Average waiting time of the customer in the system

OR

4d) For the admission process 10 students are arriving per unit and administrator requires 6 minutes to complete the admission process. (8) CO4

Find out below things using queueing theory formulas.

1) Average waiting time of the students in the queue

2) Probability that administrator is sitting idle

3) Average number of students in the queue

Average number of students in the system

Question No. 5

5a) XYZ Company is considering three options for managing its data processing operations, continuing with own staff, outsourcing or the use of combination. The annual profit of each option depends on demand as follows: (8) CO5

Staffing Option	**Demand Profit (Rs.)**		
	High	**Medium**	**Low**
Own Staff	650	650	600
Outsourcing	900	600	300
Combination	800	650	500

Determine Optimal Strategy using
1. Maximin Criterion

2. Laplace Criterion

3. Hurwicz Criterion (α =0.6)

4. Minimin Criterion

OR

5b) Consider below profit table. (8) CO5

	States

Strategies	S1	S2	S3	S4
A	30	10	10	8
B	40	-15	5	7
C	50	20	-6	10

Determine Optimal Strategy using
1. Maximin Criterion

2. Laplace Criterion

3. Hurwicz Criterion (α =0.6)

4. Minimax Regret Criterion

5c) Write down the steps to solve Decision Theory problems. (8) CO5

OR

5d) Explain below criterion with the help of an example. (8) CO5

1) Minimax Criterion

2) Laplace Criterion

3) Expected Monetary value Criterion

4) Expected value with perfect information criterion

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