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

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

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester: III
Class: SY	Program: MBA
Branch Code: M.B.A.	Pattern:2022
Name of Course: Decision Science	Course Code: MBA22 3 0 02
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.

Question No. 1 Attempt following Question

1a) Calculate Quartile Deviation as well as Coefficient of Quartile Deviation for below data. (6) CO 1

Class	**00-10**	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**80-90**	**090-100**
Frequency	5	3	4	3	3	4	7	9	7	8

Question No. 2 Attempt following Question

2a) There are 500 students in the class. Marks of the students are randomly distributed with mean 44 and standard deviation 5. (6) CO 2

Find the number of students who scores

1) More than 50 marks

2) Less than 50 marks

3) Less than 40 marks

4) Greater than 40 marks

5) Between 39 and 49 marks

Question No. 3 Attempt following Question

3a) Solve the below Transportation Problem and find Initial Basic Solution by North West corner Rule method and also find Optimum Solution by MODI method. (8) CO3

	Destination				
Source	**D_1**	**D_2**	**D_3**	**D_4**	**Supply**
S_1	3	1	7	4	**300**
S_2	2	6	5	9	**400**
S_3	8	3	3	2	**500**
Demand	**250**	**350**	**400**	**200**	

OR

3b) Solve the below Transportation Problem and find Initial Basic Solution by VAM method and also find Optimum Solution by MODI method. (8) CO3

	A	**B**	**C**	**D**	**Availability**
D1	20	22	17	04	**120**
D2	24	37	09	07	**70**
D3	32	37	20	15	**50**
Demand	**60**	**40**	**30**	**110**	

3c) The marketing director of a multi-unit company is faced with a problem of assigning 5 senior managers to six zones. From the past experience he knows that the efficiency percentage judged by sales, operating costs etc. depends on the manager-zone combination. The efficiency of different managers are given here. Find out which zone will be managed by a junior manager due to non-availability of senior manager. (8) CO3

	Zones					
Managers	**1**	**2**	**3**	**4**	**5**	**6**
A	73	91	87	82	78	80
B	81	85	69	76	74	85
C	75	73	83	84	78	91
D	93	96	86	91	83	82
E	90	91	79	89	69	76

OR

3d) Solve the following assignment problem for minimization. (8) CO3

	1	**2**	**3**	**4**	**5**
A	8	8	8	11	12
B	4	5	6	3	4
C	12	11	10	9	8

D	18	21	18	17	15
E	10	11	10	8	12

Find out the optimum cost.

Question No. 4 Attempt following Question

4a) A project has been defined to contain the following list of activities along with their required time of completion. (8) CO4

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

a. Draw Network Diagram

b. Calculate Forward Pass and Backward Pass

Identify Critical Path

OR

4b) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found that each customer requires 6 minutes to be served find out. (8) CO4

a. Average Queue Length

b. Average number of customers in the system

c. Average waiting time of customer in the queue

d. Average waiting time of customer in the system

4c) Discuss the concept of Queuing Theory and various terminologies used in it. (8) CO4

OR

4d) Given the Following Information: (8) CO4

Activity	Optimistic Time (Weeks)	Pessimistic Time (Weeks)	Most Likely Time (Weeks)
1-2	6	8	7
1-3	1	9	2
1-4	1	7	4
2-6	1	3	2
3-5	1	9	2
4-5	1	9	5
4-7	2	8	2
5-6	4	4	4
5-7	4	10	4
6-8	2	14	5
7-8	2	8	2

a. Construct Project Network Diagram

b. Find the expected duration

Find Critical Path

Question No. 5 Attempt following Question

5a) A food products' company is contemplating the introduction of a revolutionary new product with new packaging or replacing the existing product at much higher price (S.). It may even make a moderate change in the composition of the existing product, with a new packaging at a small increase in price (S2), or may mall a small change in the composition of the existing product, backing it with the word 'New' and a negligible increase in price (S3). The three possible states of nature or events are: (i) high increase in sales (N_1), (ii) no change in sales (N_2) and (iii) decrease in sales (N_2). The marketing department of the company worked out the payoffs in terms of yearly net profits for each of the strategies of three events (expected sales). This is represented in the following table: (8) CO5

State of Nature	Strategy		
	S1	S2	S3
N1	7,00,000	5,00,000	3,00,000
N2	3,00,000	4,50,000	3,00,000
N3	1,50,000	0	3,00,000

From the following payoff matrix calculate:

a. Maximin

b. Maximax

c. Laplace

d. Minimax Regret

OR

5b) Explain the rule of dominance in Game without saddle point(proper Steps are required.) (8) CO5

5c) Solve the following game (8) CO5

Player A	Player B		
	B1	B2	B3
A1	1	7	2
A2	6	2	7
A3	5	1	6

OR

5d) Mr. Ram flies quite often from town A to town B. He can use the airport bus which costs Rs 25 but if he takes it, there is a 0.08 chance that he will miss the flight. The stay in a hotel costs Rs 270 with a 0.96 chance of being on time for the flight. For Rs 350 he can use a taxi which will make 99 per cent chance of being on time for the flight. If Mr Ram catches the plane on time, he will conclude a business transaction that will produce a profit of Rs 10,000, otherwise he will lose it. Which mode of transport should Mr Ram use? Answer on the basis of the EMV criterion. (8) CO5

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