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Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) Regular EXAMINATION October 2025
Third SEMESTER

Discipline Specific Core Course (DSC) - MG3DSCMAT203 - ESSENTIALS
OF QUANTITATIVE DECISION MAKING
(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

{Short Answer Questions}

Answer any **5** questions

Each question carries **2** marks

1. The speeds of a car for three equal distances are 30 km/h, 40 km/h, and 60 km/h. Find the average speed using harmonic mean. [A] / [CO1]
2. Find the standard deviation of 5, 10, 15 [A] / [CO1]
3. What does it suggest if points in a scatter diagram are scattered randomly with no clear pattern? [U] / [CO2]
4. Find the regression coefficient b_{yx} , if $2x - 4y - 5 = 0$ is the regression equation of y on x [U] / [CO2]
5. Define the terms solution and feasible solution of LPP [U] / [CO3]
6. Give two examples of surplus variables [A] / [CO3]
7. What is the main use of the MODI method in transportation problems? [U] / [CO4]
8. Explain the North - West Corner method for finding an initial basic feasible solution of a Transportation problem. [K] / [CO4]

[2x5 = 10]

Part B

{Short Essay Questions}

Answer any **5** questions

Each question carries **6** marks

9. Find the mean deviation about median of the following data

[A] / [CO1]

Salary	20	30	40	50	60	70
Number of Persons	8	12	20	10	6	4

10. When the median is 24, find the missing frequency?

[A] / [CO1]

Sales	0-10	10-20	20-30	30-40	40-50
No. of shops	5	25	?	18	7

11. Explain the different types of correlation.

[U] / [CO2]

12. Calculate Karl Pearson's coefficient of correlation from the following data. Also comment on the result.

[A] / [CO2]

Series X	2	4	3	2	1
Series Y	5	9	8	7	3

13. Write the general form of a Linear Programming Problem.

[K] / [CO3]

14. Solve the following LPP graphically

[A] / [CO3]

Maximize: $Z = 8x + y$

Sub. to

$$x + y \leq 40$$

$$2x + y \leq 60$$

$$x \geq 0, y \geq 0$$

15. Use Least Cost Matrix method to obtain an initial feasible solution to the following transportation problem.

[A] / [CO4]

	Destination				
Source	A	B	C	D	Supply
1	6	3	5	4	22
2	5	9	2	7	15
3	5	7	8	6	8
Demand	7	12	17	9	

16. Formulate the following the transportation problem as an LPP.

[U] / [CO4]

To	1	2	3	Capacity
From				
O1	6	1	2	6
O2	5	2	3	4

O3	1	4	5	10
Demand	2	3	15	

[6x5 = 30]

Part C

{Essay Questions}

Answer any 3 questions

Each question carries 10 marks

17. In two factories A and B engaged in the same industry in an area, the following results were obtained [A] / [CO1]

Factory	Mean weekly salary	S.D	No.of wage earners
A	345	25	450
B	290	45	530

- a) Which factory pays larger amount as weekly wages?
 b) Which factory shows greater variability in the wage rate?
 c) Obtain the combined mean and S.D of all the workers
18. The following data gives the age and blood pressure (BP) of 10 sports persons. [A] / [CO2]

Name	A	B	C	D	E	F	G	H	I	J
Age(X)	42	36	50	60	65	35	58	55	51	48
BP(Y)	98	93	102	82	108	105	85	110	102	118

- (a) Find regression equation of Y on X
 - (b) Find the correlation coefficient (r) using the regression coefficients
 - (c) Estimate the blood pressure of a sports person whose age is 45.
19. Calculate Spearman's rank coefficient of correlation by means of ranking method of rank differences. [A] / [CO2]

Series X	40	50	60	60	80	50	70	60
Series Y	800	1200	1600	1700	1300	2000	2100	1300

20. A manufacturer of furniture makes two products, chairs and tables. Processing of these products is done on two machines A and B. A chair requires 5 hours on machine A and 8 hours on machine B, a table requires 7 hrs on machine A and no time on machine B. There are 20 hours of time per day available on machine A and 30 hours on machine B. Profit gained by the manufacturer from a chair is Rs.50 and from a table is Rs.100 respectively. Formulate the problem as a Linear Programming Problem. Also solve this problem graphically. [An] / [CO3]

21. Solve the following L.P.P by Simplex method

[A] / [CO3]

$$\text{Maximise } Z = 5X_1 + 3X_2$$

$$\text{Sub. to } X_1 + X_2 \leq 2$$

$$5X_1 + 2X_2 \leq 10$$

$$3X_1 + 8X_2 \leq 12$$

$$X_1, X_2 \geq 0$$

22. Find the initial basic feasible solution to the following transportation problem using (i) North - West corner method (ii) VAM

[A] / [CO4]

	A	B	C	Supply
1	5	1	8	15
2	3	9	6	25
3	4	2	7	30
4	7	11	10	20
Demand	18	25	22	

[10x3 = 30]