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END TERM EXAMINATION

SECOND SEMESTER [BBA] JULY 2023

Paper Code: BBA-104 **Subject: Decision Techniques for Business**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions.

Q1 (a) In a group of 1000 wage earners the monthly wages of 4% are below Rs. 60 and those of 15% are under Rs.62.50, 15% earned Rs. 95and over, and 5% get Rs. 100 and over. Find the median wage. (7)

(b) The means of two samples of series of 50 and 100 respectively are 54.4 and 50.3 and standard deviations are 8 and 7. Obtain the mean and standard deviations of the sample size 150 obtained by combining the two samples. (8)

Q2 (a) Determine the median wage graphically from the following data: (7)

Wages	No. of workers	Wages	No. of workers
700-800	4	1100-1200	12
800-900	6	1200-1300	7
900-1000	10	1300-1400	3
1000-1100	16		

(b) For the following data of the frequency of visit of customers in a shop in the month of April, year 2017, starting from 1st to 30th (Row wise). (8)

3	4	1	4	4
4	2	3	4	4
5	9	4	2	5
7	8	7	1	3
8	6	8	6	6
9	9	9	5	5

(i) Draw a frequency table and find the dates on which customer are more frequent.

(ii) Find the average number of visit in this month.

(iii) Which of the week showing more favorable visit for the customers?

Q3 (a) Prove that the Standard deviation is independent of any change of origin but is dependent on the change of scale. (7)

(b) Find the standard deviation and coefficient of variation from the following data: (8)

Wages	No. of workers	Wages	No. of workers
Up to Rs. 110	12	Up to Rs. 150	157
Up to Rs. 120	30	Up to Rs. 160	202
Up to Rs. 130	65	Up to Rs. 170	222
Up to Rs. 140	107	Up to Rs. 180	230

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Q4 (a) Given standard deviation with respect to data X is 3 and regression equations are **(7)**

$4X - 5Y + 33 = 0$,
$20X - 9Y - 107 = 0$

Find (a) A.M of data X
(b) A.M of data Y
(c) Standard deviation of data Y
(d) Correlation coefficient

(b) From the following table, find correlation coefficient between age and playing habit of students: **(8)**

Age (years):	15	16	17	18	19	20
No. of students:	250	200	150	120	100	80
Regular players:	200	150	90	48	30	12

Q5 (a) Define Regression. Why are there two regression lines? Under what conditions can there be only one regression line? **(7)**

(b) A consulting firm is preparing a study on consumer behavior. The company collected the following data in thousand rupees to determine whether there is a relationship between consumer income and consumption levels: **(8)**

Consumer No.	1	2	3	4	5	6
Income(Rs.)	300	350	320	400	295	315
Consumption(Rs.)	250	275	270	300	269	290

Calculate correlation coefficient for the above data. Write your comments about the correlation coefficient' value

Q6 (a) Solve the following LPP by graphical method: **(7)**

Minimize $Z = 4x + y$

Subject to the constraints: $3x + y = 3$, $4x + 3y \geq 6$, $x + 2y \leq 4$ and $x, y \geq 0$.

(b) Write the dual to the following LPP : **(8)**

Maximize $Z = 20x_1 + 15x_2 + 18x_3 + 10x_4$

Subject to the constraints: -

$4x_1 - 3x_2 + 10x_3 + 4x_4 \leq 60$
$x_1 + x_2 + x_3 = 27$
$-x_2 + 4x_3 + 7x_4 \geq 35$

$x_1, x_2, x_3 \geq 0$ and x_4 : unrestricted in sign

Q7 Maximize $Z = 80x_1 + 60x_2 + 30x_3$ **(15)**

Subject to constraints: $10x_1 + 4x_2 + 5x_3 \leq 2000$
$2x_1 + 5x_2 + 4x_3 \leq 1009$

$x_1, x_2, x_3, \geq 0$

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Q8 Given below is a transportation table taken from the solution process for a transportation problem

Factories	Distribution Centres 1	2	3	4	
A			(5000)		
	10	8	7	12	
B				(4500)	(1500)
	12	13	6	10	
C	(7000)		(500)		(1500)
	8	10	12	14	

Answer the following questions, giving brief answers (4×5)

(i) Is this solution feasible?
(ii) Is this solution degenerate?
(iii) Is this solution optimal? If not, find the optimal solution
(iv) Does the problem have alternative optimal solution?

Q9 A company has 4 machines to be assigned to 4 of the 5 workers available for the purpose. The expected production from each machine operated by each worker is given below: (15)

Expected Daily Production (in units) Workers

Machine	A	B	C	D	E
I	40	46	48	36	48
II	48	32	36	29	44
III	49	36	41	38	45
IV	30	46	49	44	47

Suggest optimum assignment of workers to machines.

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