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# END TERM EXAMINATION

THIRD SEMESTER [BCA] JANUARY-FEBRUARY 2023

Paper Code: BCA-201

Subject: Mathematics-III

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit. Use of calculator is permitted.

- Q1 Attempt **any three** questions in brief:- (3x5=15)
- (a) Define (i) Transportation problem (ii) Assignment problem (iii) LPP.
- (b) The arithmetic mean of 50 items of a series was calculated by a student as 20. However, it was later discovered that an item 30 was misread as 40. Find the correct value of mean.
- (c) Define (i) Ogives (ii) Histogram (iii) Lorenz curve.
- (d) For a bivariate data, the mean value of X is 20, the mean value of Y is 45. The regression coefficient of Y on X is 4 and that of X on Y is 1/9. Find (i) The correlation coefficient.  
(ii) The standard deviation of X if standard deviation of Y is 12.
- (e) Solve the following LPP graphically  
Minimize  $Z = 3x + 9y$   
Subject to the constraints  
 $x + 3y \leq 60$   
 $x + y \geq 10$   
 $x \leq y, \quad x, y \geq 0.$

## UNIT-I

- Q2 (a) Find out the missing frequencies from the given data: (7)

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	8	?	6	?	5	9	50

The arithmetic mean is 25.

- (b) The following table gives the less than cumulative frequencies of 199 man, each of age 20 years or more, of a group: (8)

Age below (in years)	25	30	35	40	45	50	55	60	65	70
Cumulative Frequency	21	40	90	130	146	166	176	186	195	199

Find the mean age.

## OR

- Q3 (a) The marks obtained by 60 students in a certain paper out of 75 are given below: (7)

Marks	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No. of students	4	5	11	6	5	8	9	6	4	2

Calculate the median.

- (b) Find mean deviation about the mean for the following data: (8)

$X_i$	2	5	6	8	10	12
$F_i$	2	8	10	7	8	5

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Q4

**UNIT-II**

(a) A computer while calculating  $r(XY)$  from 25 pairs of observation obtained the following values:  $n=25$ ;  $\sum X = 125$ ;  $\sum Y = 100$ ,  $\sum X^2 = 650$ ;  $\sum Y^2 = 460$ ;  $\sum XY = 508$ . A recheck showed that he had copied wrong two pairs (6,14), (8,6) while the correct values were (8,12), (6,8). Obtain the correct value of co-relation coefficient.

(b) Two judges in a beauty competition rank the 12 entries as follows: (8) (7) (8)

<b>X</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>Y</b>	12	9	6	10	3	5	4	7	8	2	11	1

What degree of agreement is there between the judgment of the two judges?

Q5

**OR**

(a) The lines of regression of a bivariate population are  $8X - 10Y + 66 = 0$  and  $40X - 18Y = 214$ . The variance of X is 9. Find the mean values of X and Y. Also obtain the standard deviation of Y and the coefficient of correlation between X and Y.

(b) Given below the data related to sale and purchase. Obtain the equation of two-regression lines. (8) (7)

<b>Purchase</b>	62	72	98	76	81	56	76	92	88	49
<b>Sales</b>	112	124	131	117	132	96	120	136	97	85

Q6

**UNIT-III**

Solve the following LPP by using Big-M method.  
Maximize  $Z = 3x_1 - x_2$   
Subject to the constraints (15)

$2x_1 + x_2 \geq 2$   
 $x_1 + 3x_2 \leq 3$   
 $x_2 \leq 4$   
and  $x_1, x_2 \geq 0$

**OR**

Q7 Solve the following LPP.  
Minimize  $Z = 3x_1 + 2.5x_2$   
Subject to the constraints (15)

$2x_1 + 4x_2 \geq 40$   
 $5x_1 + 2x_2 \geq 50$   
 $x_1 \geq 0, x_2 \geq 0$

**UNIT-IV**

Q8 Five different machines can do any of five required jobs, with different profit resulting from each assignment as shown in the adjoining table. Find out maximum profit possible through optimal assignment. (15)

		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>Jobs</b>	<b>1</b>	30	37	40	28	40
	<b>2</b>	40	24	27	21	36
	<b>3</b>	40	32	33	30	35
	<b>4</b>	25	38	40	36	36
	<b>5</b>	29	62	41	34	39

**OR**

Q9 A Company has four plants  $P_1, P_2, P_3, P_4$  from which it supplies to three markets  $M_1, M_2, M_3$ . Determine the optimal transportation plan from the following data giving the plant to market shifting costs, quantities available at each plant and quantities required at each market. (Using Modi Algorithm) (15)

<b>Plants</b>	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>	<b>P<sub>3</sub></b>	<b>P<sub>4</sub></b>	<b>Required</b>
<b>Market</b>					
<b>M<sub>1</sub></b>	19	14	23	11	11
<b>M<sub>2</sub></b>	15	16	12	21	13
<b>M<sub>3</sub></b>	30	25	16	39	19
<b>Availability</b>	6	10	12	15	43

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