

**END TERM EXAMINATION**

THIRD SEMESTER [BCA] DECEMBER-2015

Paper Code: BCA 201

Subject: Mathematics-III  
(Batch 2011 Onwards)

Time : 3 Hours

Maximum Marks : 75

Note: Attempt any five questions including Q.No.1 which is compulsory.  
Select one question from each unit.

- Q1. a) Define frequency Polygon and also discuss merits of a statistics.  
b) The mean of 200 items was 50. Later on it was discovered that two items were misread as a 2 and 8 instead of 192 and 88. Find out the correct mean.  
c) Calculate the coefficient of concurrent deviations from the following:

Year	2004	2005	2006	2007	2008
Supply	140	154	140	200	170
Price (Rs.)	180	160	190	200	210

- d) The following data relate to regression analysis involving a sample of 6 items:  
 $\sum X = 18$ ;  $\sum Y = 216$ ;  $\sum X^2 = 70$ ;  $\sum Y^2 = 8332$   $\sum XY = 738$ ; obtain the two regression line.  
e) Find the basic feasible solution for the following inequalities:  
 $x_1 + 2x_2 \leq 7$  and  $2x_1 - x_2 = 4$  where  $x_1, x_2 \geq 0$ . **(5x5=25)**

**Unit-I**

- Q2. a) For the following data, calculate 72<sup>th</sup> percentile and median. **(8)**

Class Interval	Less than 200	200-250	250-300	300-350	350-400	Above 400
Frequency	5	15	20	30	20	8

- b) For the following data draw orgives. **(4.5)**

Class Interval	10-14	15-19	20-24	25-29	30-34
Freq.	6	10	11	12	11

- Q3. An incomplete distribution is given below: **(12.5)**

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
Freq.	12	30	?	65	?	25	18	229

Given that median value is 46.

- a) Using the median formula fill up the missing frequency.  
b) Calculate standard deviation of the complete table.

P.T.O.

**Unit-II**

- Q4. Two random variables have the regression equations  $3x+2y-26=0$ ;  $6x+y-31=0$ .

Calculate

- a) Mean value of X and Y (4)  
 b) The coefficient of regression and correlation. (4)  
 c) If variance of X is 25, find S.D. of Y from the data given above. (4.5)

- Q5. a) Two Judges in a beauty competition rank the 12 entries as follows:

X	1	2	3	4	5	6	7	8	9	10	11	12
Y	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? (6.5)

- b) If regression coefficients are 0.8 and 0.45, y on x and x on y respectively then calculate r? (6)

**Unit-III**

- Q6. a) Solve the following LPP by graphical method. (6)

$$\text{Minimize } Z = 5x + 8y$$

$$\text{Sub to: } x \leq 4; y \geq 2; x+y=5 \text{ and } x, y \geq 0.$$

- b) A firm makes two types of furniture: chairs and tables. The contribution for each product as calculated by the accounting department is Rs. 20 per chair and Rs. 30 per table. Both products are produce on the three machines M<sub>1</sub>, M<sub>2</sub>, M<sub>3</sub>. The time required by each product and total time available per week on each machine are as follows:

Machine	Chair	Table	Available Hours
M <sub>1</sub>	3	3	36
M <sub>2</sub>	5	2	50
M <sub>3</sub>	2	6	60

How should the manufactures schedule his production in order to maximize contribution? (6.5)

- Q7. a) Obtain the dual of the following LPP: (6)

$$\text{Maximize } Z = 7x_1 + 5x_2$$

$$\text{Sub to: } 3x_1 + x_2 \leq 48$$

$$2x_1 + x_2 \leq 40$$

$$x_1, x_2 \geq 0.$$

- b) Using simplex method solve the Linear Programming Problems. (6.5)

$$\text{Maximize } Z = 7x_1 + 5x_2$$

$$\text{Sub to: } x_1 + 2x_2 \leq 6$$

$$4x_1 + 3x_2 \leq 12$$

$$\forall x_1, x_2 \geq 0.$$

P.T.O.

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**Unit-IV**

- Q8. a) Define Restriction in Assignment Problem, discuss with an example? (4)  
b) Given the following data, determine the least cost allocation of the Available Machines to five jobs. (8.5)

Machines	Jobs				
	A	B	C	D	E
1	25	29	31	42	37
2	22	19	35	18	26
3	39	38	26	20	33
4	34	27	28	40	32
5	24	42	36	23	45

- Q9. Solve the following transportation problem and test for optimality to find the optimal solution using MODI method. (12.5)

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	Capacity
O <sub>1</sub>	12	4	9	5	9	55
O <sub>2</sub>	8	1	6	6	7	45
O <sub>3</sub>	1	12	4	7	7	30
O <sub>4</sub>	10	15	6	9	1	50
<b>Requirements</b>	<b>40</b>	<b>20</b>	<b>50</b>	<b>30</b>	<b>40</b>	

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