

**END TERM EXAMINATION**

THIRD SEMESTER [BCA] DECEMBER 2016

Paper Code: BCA-201

Subject: Mathematics-III

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 (i) ogives, (ii) histogram (iii) relation between mean, median and mode. (5)
- (b) Karl Pearson's coefficient of skewness of a distribution is 0.32, its standard deviation is 6.5 and mean is 29.6, find the mode of the distribution. (5)
- (c) A contractor employs three types of workers – male, female and children. To a male worker he pays Rs. 200 per day, to a female worker Rs. 150 per day and to a child worker Rs. 85 per day. What is the average wage per day paid by the contractor? (5)
- (d) Find the two lines of regression and coefficient of correlation for the data given below: (5)
- $N = 18; \sum x = 12; \sum y = 18; \sum x^2 = 60; \sum y^2 = 96; \sum xy = 48.$
- (e) Obtain the dual of the following Linear Programming Problem: (5)
- Maximize  $z = 7x_1 + 5x_2$   
Subject to Constraints:

$$3x_1 + x_2 \leq 48$$

$$2x_1 + x_2 \leq 40$$

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

**UNIT-I**

- Q2 (a) Find the missing frequencies for the class intervals using the following data of 150 students given that the mean marks is 65. (6.5)

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	3	8	11	15	?	25	40	?	1	1

- (b) Compute quartile deviation from the following data: (6)

x	10-20	20-30	30-40	40-50	50-60	60-70	70-80
f	12	19	5	10	9	6	6

- Q3 (a) Suppose that samples of Polythene bags from two Manufacture, A and B are tested by a Prospective buyer for bursting pressure, with the following results: (6.5)

Bursting Pressure (16.)	Number of Bags	
	A	B
5.0-9.9	2	9
10.0-14.9	9	11
15.0-19.9	29	18
20.0-24.9	54	32
25.0-29.9	11	27
30.0-34.9	5	13
	<b>110</b>	<b>110</b>

- (b) The mean of 5 observations is 4.4 and variance is 8.24. If three of the five observation are 1, 2 and 6. Find the other two. (6)

P.T.O.

BCA-201  
P/12

UNIT-II

Q4 (a) Calculate the correlation coefficient from the following data:- (6)

<b>x:</b>	6	8	12	15	18	20	24	28	31
<b>y:</b>	10	12	15	15	18	25	22	26	28

(b) Ten Participants in a Context are ranked by three judges as follows:-

<b>x</b>	1	6	5	10	3	2	4	9	7	8
<b>y</b>	6	4	9	8	1	2	3	10	5	7
<b>z</b>	7	4	5	6	8	2	1	9	3	10

Calculate the rank correlation coefficient and also discuss which pair of judges has similar taste. (6.5)

Q5 (a) Calculate (i) two regression lines, (ii) two regression coefficient and (iii) coefficient of correlation; from the following data:- (6.5)

$N = 10; \sum x = 350; \sum y = 210; \sum (X-35)^2 = 162;$   
 $\sum (Y-31)^2 = 222, \sum (X-35)(Y-31) = 192$

(b) Two random variables have the regression equations  
 $3x+2y-26 = 0,$   
 $6x+y-31 = 0$

Calculate:-

- (i) Mean value of X and Y.
- (ii) The coefficient of Correlation
- (iii) If  $\text{var}(x) = 25$ , find standard deviation of X from the data given above.

(6)

UNIT-III

Q6 (a) Write the dual of the following primal problems and also find its optimal solution using simplex method.

$\text{Min } z = 8x_1 + 9x_2$

Sub to Constraints:

$x_1 - 3x_2 \geq 2$   
 $x_1 + x_2 \geq 6$   
 $\forall x_1, x_2 \geq 0$

(6.5)

(b) Solve the following linear programming problem by Graphical Method:

$\text{Max } z = 5x_1 + 4x_2$

Subject to Constraints:

$x_1 - 2x_2 \leq 1$   
 $x_1 + 2x_2 \geq 3$   
 $\forall x_1, x_2 \geq 0.$

(6)

Q7 A branch of PNB has only one typist. Since the typing work varies in length, the mean service rate 8 letters/hr. The letters arrive at a rate of 5/hr during the entire 8 hr work day. If the type write is valued 1.50/- Rs. per hour, determine:-

- (i) The equipment utilization
- (ii) The Percent time that an arriving letter has to wait.
- (iii) The average system time
- (iv) The average cost due to waiting on the part of the type writer.

P.T.O.

UNIT-IV

Q8 Given the following data, determine the least cost allocation of the available machines to five jobs (12.5)

Machines	Jobs				
	A	B	C	D	E
1	25	29	31	42	37
2	22	19	35	18	26
3	39	8	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 optimal solution by 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
Requirement	40	20	50	30	40	

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BCA-201  
P3/3

BCA-201  
P2/3