END TERM EXAMINATION

THIRD SEMESTER [BCA] DECEMBER-2019

Paper Code: BCA201	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.

Q1　Attempt **any three** following questions in brief:-　　　　(3x5=15)

a) How would you account for the predominant choice of A.M. as a measure of central tendency? Under what circumstances would it be appropriate to use mode or median?

b) Define (i) ogives, (ii) histogram (iii) Lorenz curve.

c) When is mode preferred over other form of average?

d) The marks obtained by 9 students in a test are 25,20,15,45,18,7,10,38 and 12. Find the value of Q_1, Q_3, I.R and Q.D.

e) Define (i) Transportation problem (ii) LPP (iii) Stepping-Stone method

UNIT I

Q2. (a) Determine the median wage graphically from the following data:　　(5)

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) Coefficient of variation of two series is 60% and 80%. Their standard deviations are 24 and 20. What are their arithmetic means?　　(5)

(c) 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.95 and over, and 5% get Rs.100 and over. Find the median wage.　　(5)

Q3. (a) 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),　　(5)

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	3	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?

(b) Prove that the Standard deviation is independent of any change of origin but is dependent on the change of scale.　　(5)

[P.T.O.]

BCA - 201

c) Find the standard deviation and coefficient of variation from the following data: **(5)**

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

UNIT II

Q4.a) Given standard deviation with respect to data X is 3 and regression equation are **(5)**

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

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? **(5)**

b) A consulting firm is preparing a study on consumer behavior. The company the following data in thousand rupees to determine whether there is a relationship between consumer income and consumption levels: **(10)**

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

UNIT III

Q6. (a) The manager of an oil refinery must decide on the optimal mix of two possible blending processes of which the inputs and outputs per production run are as follows: **(7)**

Process	Input(units)		Output (units)	
	Crude A	Crude B	Gasoline X	Gasoline Y
1	5	3	5	8
2	4	5	4	4

The maximum amounts available of crude A and B are 200 units and 150 units, respectively. Market requirement show that at least 100 units of gasoline X and 80 units of gasoline Y must be produced. The product per production run from process 1 and 2 is Rs.300 and Rs.400 respectively. Solve the above Linear Programming Problem by **GRAPHICAL** method. **(8)**

(b) Minimize $z=2x_1+3x_2$ **(8)**
Subject to: $x_1-2x_2 \leq 0$
$-2x_1+3x_2 \geq -6$
x_1, x_2 unrestricted.

Q7. Maximize $Z = 4x_1 + x_2 + 3x_3 + 5x_4$ **(15)**
Subject to constraints: $4x_1 - 6x_2 - 5x_3 - 4x_4 \geq -20$
$-3x_1 - 2x_2 + 4x_3 + x_4 \leq 10$
$-8x_1 - 3x_2 + 3x_3 + 2x_4 \leq 20$
$x_1, x_2, x_3, x_4 \geq 0$

UNIT IV

Q8. Given below is a transportation table taken from the solution process for a transportation problem: **(15)**

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

Answer the following questions, giving brief answers:
(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? If yes, give another optimal solution. **(15)**

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:
Expected Daily Production (in units)

Machine	Workers				
	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. **(15)**

****