(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

THIRD SEMESTER [BCA] NOV.-DEC. 2018

Paper Code: BCA-201 **Subject: Mathematics-III**

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

Note: Attempt any five questions. Use of calculator is allowed.

Q1 The following data which is the number of tonnes shipped weekly across the Pacific by a shipping company.

398, 412, 560, 476, 544, 690, 587, 600, 613, 457, 504, 477, 530, 641, 359, 566, 452, 633, 474, 499, 580, 606, 344, 455, 505, 396, 347, 441, 390, 632, 400, 582

(a) Assume these data represent an entire population. Find the population mean and the population standard deviation. **(7)**

(b) Group the data into classes, and draw a histogram of the frequency distribution. **(8)**

Q2 (a) The following data are numbers of colour television sets manufactured per day at a given plant: 15, 16, 18, 19, 14, 12, 22, 23, 25, 20, 32, 17, 34, 25, 40, 41. Draw a frequency polygon and an ogive for these data. **(7)**

(b) Given the set of data 4, 8, 9, 8, 6, 5, 7, 5, 8, find each of the following sample statistics: (8)

(i) Mean (ii) Median (iii) Mode (iv) Midrange

Q3 The following table shows the average weights for given heights in a population of men. **(5x3)**

Heights (x cm)	160	165	170	175	180	185
Weights (y kg)	65.1	67.9	70.1	72.8	75.4	77.2

(a) The relationship between the variables is modelled by the regression equation $y=ax+b$. Write down the value of **a** and of **b**.

(b) Use this relationship to estimate the weight of a man whose height is 177 cm.

(c) Find the correlation coefficient.

Q4 (a) For the data X and Y given below: **(4x3)**

X: 1313 2020 2222 1818 1919 1111 1010 1515

Y: 1717 1919 2323 1616 2020 1010 1111 18

(i) Find Spearman's rank correlation coefficient.

(ii) Find the regression line

(iii) Find the coefficient of determination for the regression line fit.

(b) Correlation and Causality are one and the same. Critically comment. **(3)**

Q5 (a) Maximize $p = 2x - 3y + z$ **(10)**

subject to $x + y + z \le 10$

$4x - 3y + z \le 3$

$2x + y - z \le 10$

$x \ge 0, y \ge 0, z \ge 0$

Using the Simplex method.

P.T.O.

P1/P2

(b) Explain the concept of duality in context to linear programming problems. **(5)**

Q6 (a) Compare and contrast PERT and CPM. **(5)**
(b) Define and explain (1) pessimistic time (2) Optimistic time **(4)**
(c) The project activities, precedence relationships and durations are described in the table. The critical path of the project is **(6)**

Activity	Precedence	Duration (in days)
P	-	3
Q	-	4
R	P	5
S	Q	5
T	R,S	7
U	R,S	5
V	T	2
W	U	10

Q7 A trucking company has a contract to move 115 truckloads of sand per week between three sand-washing plants W,X and Y, and three destinations, A,B and C. Cost and volume information is given below. Compute the optimal transportation cost and the transportation plan.**(15)**

To From	Project A	Project B	Project C	Supply
Plant W	5	10	10	35
Plant X	20	30	20	40
Plant Y	5	8	12	40
Demand	45	50	20	

Q8 A head of department has four lecturers to assign to pure maths (1), mechanics (2), statistics (3) and Quantitative techniques (4). All of the teachers have taught the courses in the past and have been evaluated with a score from 0 to 100. The scores are shown in the table below. **(15)**

	Maths	Mechanics	Statistics	Quantitative Techniques
Mr. Sharma	80	55	45	45
Mr. Prakash	58	35	70	50
Mr. Thakran	70	50	80	65
Mr. Kumar	90	70	40	80

The head of department wishes to know the optimal assignment of teachers to courses that will maximize the overall total score. Give the optimal assignment of teachers and courses / papers as well as the optimal score.

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