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18/129-C

B.C.A. (Third Semester) Examination, 2018

Paper : 301 (First)

(*Computer Based Numerical and Statistical Techniques*)

Time : Three Hours] *[Maximum Marks : 70*

Note : Attempt questions from **all** sections as per instructions. Use of Calculator is allowed.

Section-A

(Very Short Answer Type Questions)

Note : Attempt **all** parts of this question. Give the answer of each part in about 50 words.

$1\frac{1}{2} \times 10 = 15$

1. (i) Prove that $\Delta \log x = \log\left(1 + \frac{h}{x}\right)$

   (ii) Define Positive and Negative Correlation.

   (iii) What is the difference between internat and external source of data.

P.T.O.

(iv) Explain Bisection method.

(v) Prove that $(1 + \Delta)(1 - \nabla) = 1$

(vi) Define simple and weighted mean.

(vii) Discuss Gauss Seidel Method.

(viii) What is the coefficient of Correlation.

(ix) Give the formula of Lagrange's interpolation.

(x) What is the Normalization?

Section-B

(Short Answer Type Questions)

Note : Attempt **all** questions. Give answer of each question in about 200 words. $7 \times 5 = 35$

2. Prove that $\frac{d(y_x)}{dx} = \frac{1}{h}(y_{x+h} - y_{x-h}) - \frac{1}{2h}(y_{x+2h} - y_{x-2h}) + \frac{1}{3h}(y_{x+3h} - y_{x-3h}) \ldots\ldots\ldots\ldots$

OR

Derive Newton Divided difference formula for interpolation.

3. Use Gauss's forward formula to find y_{30}, given that

$y_{21} = 18.4708$, $y_{25} = 17.8144$, $y_{29} = 17.1070$, $y_{33} = 16.3432$, $y_{37} = 15.5154$

OR

Describe Pitfalls of floating point representation.

4. In a Company there are 1080 workers of different religions. The data of the different religion are given below.

Religion	Hindu	Nepali	Islam	Christan
No.of workers	450	270	255	105

Draw a Pie-chart to represent the above data.

OR

Explain Gauss elimination direct method and pivoting.

5. Given the following information:

	Mean	**Standard Deviation**
Yield of Wheat (kg per unit area)	10	8
Rainfall	8	2

Correlation coefficient between production (yield) and rainfall r=0.5. Estimate the yield when rainfall is 9 cm.

OR

Find $\sqrt{12}$ to five places of decimal by Newton-Raphson method.

6. Find a real root of the polynomial equation $f(x)=x^5-0.346284\ x^4+\ x^3+3.768x\ +10=0$, Correct to six decimal place by using Newton-Raphson's formula and the method of synthetic division.

OR

If $r_{12}= +0.80$, $r_{13}= -0.40$, $r_{23}=-0.56$ then find partial correlation coefficients $r_{12.3}$, $r_{13.2}$, $r_{23.1}$ and multiple correlation coefficient $R_{1.23}$.

Section-C

(Long Answer Type Questions)

Note : Attempt any **two** questions. Give answer of each question in about 500 words.

10×2=20

7. For the following pairs of values of x and y find numerically the first derivative at x=4

x:	1	2	4	8	10
y:	0	1	5	21	27

8. The following marks have been obtained by a class of students in statistics (out of 100)

Paper I	Paper II
45	56
55	50
56	48
58	60
60	62
65	64
68	65
70	70
75	74
80	82
85	90

Compute the coefficient of correlation for the above data also find the equation of the lines of regression.

9. Solve the following system of equation's using Gauss Elimination method

$10x-7y+3z+5u=6,$

$-6x+8y-z-4u=5,$

$3x+y+4z+11u=2,$

$5x-9y-2z+4u=7.$

10. Estimate the sale for 1996 using the following table:

Year	Sale in thousands
1931	12
1941	15
1951	20
1961	27
1971	39
1981	52

11. Explain:

(a) Linear and Non-Linear Correlation.

(b) Difference between Correlation and regression Analysis.