**B.C.A. DEGREE EXAMINATION, APRIL 2016.**

**I YEAR — II SEMESTER**

**Allied II— ALLIED MATHEMATICS - II**

**Time : 3 hours Max. Marks : 75**

**SECTION A — (10 × 2 = 20 marks)**

**Answer any *TEN* questions.**

1. What is the order of convergence of Newton-Raphson method?
2. Write the condition for the convergence of Gauss-Seidel iteration method.
3. Using the Lagrange’s interpolation, find the polynomial through (0,0), (1,1) and (2,20).
4. Write the divided difference table for the data given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | *1* | *2* | *7* | *8* |
| *f(x)* | *1* | *5* | *5* | *4* |

1. Write the Newton’s formula for and Newton’s backward difference formula for .
2. State the formula of Simpson’s 3/8th rule.
3. Write the mean and standard deviation of binomial distribution.
4. Define moment generating function.
5. Write any two differences between correlation and regression analysis.
6. Write any two properties of regression coefficients.
7. Write any two properties of normal distribution.
8. Evaluate by Trapezoidal rule, dividing the range into 4 equal parts.

**SECTION B — (5 × 5 = 25 marks)**

**Answerany *FIVE* the questions.**

1. Find the root of 4x – ex = 0 that lies between 2 and 3 using Newton-Raphson method.
2. Using Newton’s divided difference formula, find the value of f(8) given the following table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *x* | *4* | *5* | *7* | *10* | *11* | *13* |
| *f(x)* | *48* | *100* | *294* | *900* | *1210* | *2028* |

1. From the following table, obtain the value of at point of x = 0.6

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *x* | *0* | *0.2* | *0.4* | *0.6* | *0.8* | *1.0* |
| *f(x)* | *0* | *0.12* | *0.49* | *1.12* | *2.02* | *3.20* |

1. What is the expectation of the number of failures preceding the first success in an infinite series of independent trials with constant probability *p* of success in each trial?
2. Obtain the rank correlation coefficient for the following data

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *X* | *68* | *64* | *75* | *50* | *64* | *80* | *75* | *40* | *55* | *64* |
| *Y* | *62* | *58* | *68* | *45* | *81* | *60* | *68* | *48* | *50* | *70* |

[P.T.O.]

1. Find the correlation coefficient for the following data:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *X* | *65* | *66* | *67* | *67* | *68* | *69* | *70* | *72* |
| *Y* | *67* | *68* | *65* | *68* | *72* | *72* | *69* | *71* |

1. Using Lagrange’s formula of interpolation find y(9.5) given

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | *7* | *8* | *9* | *10* |
| *y* | *3* | *1* | *1* | *9* |

**SECTION C — (3 × 10 = 30 marks)**

**Answer any *THREE* questions.**

1. Solve the system of equations

*10x + 2y + z - 9 = 0, x + 10y - z + 22 = 0 , -2x + 3y + 10 z - 22 = 0*

using Gauss-seidel iteration method.

1. Tabulate *y= x3* for *x = 2,3,4,5* and calculate the cube root of 10 correct to three decimal places.
2. Evaluate using
3. Trapezoidal rule
4. Simpson’s rule a nd rule.
5. The life of electronic tubes of a certain type may be assumed to be normally distributed with mean 155 hours and standard deviation 19 hours. What is the probability
6. that the life of a randomly chosen tube is between 136 hours and 174 hours.
7. that the life of a randomly chosen tube is less than 117 hours and
8. that the total life of two randomly chosen tubes will be more than 395 hours.

( Given P( 0 < z < 1 ) = 0.3413 and P(0 < z < 2 ) = 0.4772 ).

1. In a partially destroyed laboratory record of an analysis of correlation, the following results only are legible:

Variance of X = 9

Regression equations are : *8X – 10Y + 66 = 0, 40X - 18Y =214*.

What were:

1. the mean values of *X* and *Y*
2. the standard deviation of *Y* and,
3. the correlation coefficient between *X* and *Y* ?

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