**B.Sc. DEGREE EXAMINATION, APRIL 2016.**

**III YEAR — V SEMESTER**

**Major Paper I — NUMERICAL METHODS**

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

**SECTION A — (10 × 2 = 20 marks)**

**Answer any *TEN* questions.**

1. Can we apply iteration method to find the root of the equation *cos x* = *3x -1* in *[0, 𝝅/2]*?
2. What is the order of convergence of the Newton-Raphson method?
3. What is Gauss-Jordan elimination method?
4. Prove that  = 1 – E – 1.
5. What do you mean by interpolation?
6. If f(x) =  , find the first divided difference of [a, b].
7. Write the Newton’s formula for and Newton’s backward difference formula for .
8. State the formula of Simpson’s 3/8th rule.
9. Write Taylor’s series formula to solve with .
10. State formula for Runge-Kutta method of second order.
11. Find the first approximation of the root of the equation *x3 - x - 11=0* by using bisection method which lies between 2 and 3.
12. Find the nth difference of *ex* .

**SECTION B — (5 × 5 = 25 marks)**

**Answer any *FIVE* questions.**

1. Find the root of the equation *x3 -3x -5 = 0* by the method of false position.
2. Solve the system of equations by Gauss-Elimination method *x + y + z = 9, 2x - 3y + 4z =13* and *3x + 4y + 5z=40.*
3. Apply Lagrange formula to find *f(x)* from the following data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | *0* | *1* | *2* | *5* |
| *f(x)* | *2* | *3* | *12* | *147* |

1. The following table gives the velocity *v* of a body at *t*. Find its acceleration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *x* | *1.0* | *1.1* | *1.2* | *1.3* | *1.4* |
| *f(x)* | *43.1* | *47.7* | *52.1* | *56.4* | *60.8* |

1. Find the approximate solution for *x = 0.1, x =0.2* by Picard’s method for the equation *.*
2. Find *y(2)* if *y(x)* is the solution of assuming *y(0) =2, y(0.5) = 2.636, y(1.0) = 3.595, y(1.5) = 4.968* by Milne’s method.

[P.T.O.]

1. Dividing the range into ten equal parts find the approximate value of by Trapezoidal rule.

**SECTION C — (3 × 10 = 30 marks)**

**Answer any *THREE* questions.**

1. Find the real root of correct to three places of decimals using Newton-Raphson method.
2. Explain the difference between and and find the values of these when .
3. Using Newton’s divided difference formula find the values of f(2), f(8) and f(15) from the following data

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

1. Evaluate using Trapezoidal rule and Simpson’s  rd and th rule .
2. Using Adams Bashforth method, determine y(1.4) given that  *y(1) = 1*. Obtain the initial values from Euler’s method.