(b) Explain Runge-Kutta second order method and apply for finding the solution of the equations $\frac{dy}{dx} = x + y$ at $y(0) = 0$ with $n = 0.2$

——— ❖ ———

2016
(January)

Time : 3 hours

Full Marks : 80

The figures in the right-hand margin indicate marks.

Answer from both the Sections as per direction.

(COMPUTER PROGRAMMING AND NUMERICAL ANALYSIS)

Section – A

1. Answer any **four** of the following : $4 \times 4 = 16$

   (a) What is meant by array of structures ? Explain.

   (b) Explain constants in Fortran 77 with examples.

   (c) Write Fortran Program for numerical integration.

   (d) Briefly explain iterative method.

   (e) Explain forward and backward differences.

(f) Explain Trapezoidal rule in numerical integration.

OR

2. Answer all questions from the following :

$$2 \times 8 = 16$$

(a) What are floating point expression ?

(b) Explain what is subroutine.

(c) Define interpolation and extra polation.

(d) What is pivoting ?

(e) What do you mean by Forward Interpolation ?

(f) Explain defining variables.

(g) Distinguish between Newton's and Lagrange's interpolation method.

(h) Explain eigen values of matrices.

Section – B

Answer all questions : $16 \times 4 = 64$

3. (a) Explain the arithmetic instructions and assignment statements with examples used in Fortran 77.

OR

(b) Explain the input/output functions and conditional statements with examples used in Fortran 77.

4. (a) Develop a Fortran Program for finding the root of an equation by Runge-Kutta method.

OR

(b) Write a Fortran Programme for interpolation by Newton's forward and backward formulas.

5. (a) Explain Gauss elimination method and solve the following system of equations :

$$5x - 2y + 3 = 4 \; ; \; 7x + y - 5z = 8 \; ; \; 3x + 7y + 4z = 10.$$

OR

(b) Explain Newton-Rapson Method and find the root of an equation $x^3 - 9x + 1 = 0$ upto three decimal places.

6. (a) Explain Jacobi method to find the solution of simultaneous equations. Find the value of $f(x)$ at $x = 4$ from the following table using Lagrange's interpolation :

x :	1.5	3	6
f(x) :	−0.25	2	20

OR