

(4)

Total Pages—4

M.Sc.—Phy-IS(103)

Or

(b) Explain Newton-Raphson method and find the root of an equation $x \log_{10} x = 1.2$ correct to five decimal.

6. (a) Obtain Lagranges interpolation formula and find the form of the function $y(x)$ from the following table :

x	0	1	3	4
y	-12	0	12	24

Or

(b) Use the Runge-Kutta method to solve

$$10 \frac{dy}{dx} = x^2 + y^2, \quad y(0) = 1$$

for the interval $0 < x \leq 0.4$ with $h = 0.1$.

2019

(January)

Time : 3 hours

Full Marks : 80

Answer from both the Section as per direction

The figures in the right-hand margin indicate marks

Candidates are required to answer in their own words as far as practicable

**(COMPUTER PROGRAMMING AND
NUMERICAL ANALYSIS)**

SECTION – A

1. Answer any *four* of the following : 4 × 4

(a) Explain the input and output Commands in FORTRAN 77.

(b) Explain character management in FORTRAN 77.

(c) Write the FORTRAN program for addition.

(2)

- (d) Explain briefly the least square fitting method.
- (e) What are finite differences ? Explain different finite difference operators.
- (f) Briefly explain Runge-Kutta method.

Or

2. Answer all questions from the following : 2×8

- (a) Define character management in Fortran 77.
- (b) What is program and subprogram ?
- (c) What are prime numbers ? Explain.
- (d) Define interpolation and extrapolation.
- (e) What is pivoting ?
- (f) Define forward interpolation.
- (g) Brief trapezoidal rule in numerical integration.
- (h) What is the difference between Newton's and Lagrange's method ?

(3)

SECTION – B

Answer all questions : 16×4

3. (a) With suitable examples explain the expressions and conditional constructs used in Fortran 77.

Or

- (b) Explain Data managements and array manipulation used in Fortran 77 with suitable examples.

4. (a) Develop a Fortran program to solve the numerical integrations by trapezoidal method.

Or

- (b) Write a Fortran program with flowchart to find the solution of differential equations using Runge-Kutta method.

5. (a) Explain Matrix inversion method and find the solution of following system of equations :

$$\begin{aligned} 3x + y + 2z &= 3; & 2x - 3y - z &= -3; \\ x + 2y + z &= 4 \end{aligned}$$