

January, 2017

COMPUTER PROGRAMMING AND
NUMERICAL ANALYSIS

Time : Three Hours] [Maximum Marks : 80

Answer from both the Sections as directed. The figures in the right-hand margin indicate marks.

SECTION-A

1. Answer any **four** of the following : 4×4
- (a) Explain the different data types in Fortran 77.
 - (b) Explain array manipulations in Fortran 77.
 - (c) Write the Fortran program for sorting.
 - (d) Briefly explain matrix inversion method.
 - (e) Briefly explain Newton's interpolation formula.
 - (f) Explain Simpson's 1/3 rule for numerical integration.

OR

2. Answer **all** questions : 2×8
- (a) Define Pointer.

(2)

- (b) What do you mean by Indentation ? Explain.
- (c) What do you mean by Interactive Constructs ?
- (d) Explain validation rules.
- (e) Briefly explain least square fitting.
- (f) Explain interpolation and extrapolation.
- (g) What is Pivoting ?
- (h) What is Algorithm ? Explain.

SECTION-B

Answer all questions :

16x4

3. (a) Explain the conditional and interactive constructs used in Fortran 77 with examples.

OR

- (b) Explain character and data managements used in Fortran 77.
4. (a) Develop a Fortran program for finding the root of an equation by Newton-Raphson method.

OR

- (b) Write a Fortran program for numerical integration by trapezoidal rule.

(3)

5. (a) Explain iterative method and solve the following system of equations by matrix inversion method.

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

OR

- (b) Explain Newton-Raphson method to evaluate the roots of an equation and find the root of an equation $x^3 - x^2 - 1 = 0$.
6. (a) Explain forward and backward differences and derive the Lagranges interpolation formula

OR

- (b) Explain numerical differentiation. Evaluate

$$\int_0^{\pi/2} \sqrt{\sin \theta} d\theta \text{ using Simpson's } 1/3 \text{ rule with}$$

$$h = \pi/2.$$