

MAY 2013

P/ID 17405/RBE

Time : Three hours

Maximum : 75 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) Explain the hierarchy of operations with examples.

Or

- (b) Write a program in FORTRAN to sum the individual digits of a given number.

2. (a) Discuss the Do looping with suitable example.

Or

- (b) Explain the EQUIVALENCE statement with example.

3. (a) Find a root of the equation $x^3 - 4x - 9 = 0$ correct to 3 decimal places by using the bisection method.

Or

- (b) Find a real root of the equation $\cos x = 3x - 1$ correct to 3 decimal places by using iteration method.

4. (a) Write down the procedure for Gauss elimination method.

Or

- (b) Discuss the method of Triangulation.

5. (a) From the following table of values of x and y find dy/dx and d^2y/dx^2 .

X:	1.00	1.05	1.10	1.15	1.20	1.25	1.30
Y:	1.00000	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017

Or

- (b) Dividing the range into 10 equal parts, find the approximate value of $\int \sin x \, dx$ by trapezoidal rule.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

6. Explain different IF statements used in FORTRAN with examples.
7. Write a FORTRAN program to arrange the given set of numbers in an ascending order.
8. Discuss the functions, function subprograms and subroutines with suitable examples. Also differentiate them.

9. Using Newton-Raphson method, establish the formula $X_{n+1} = \frac{1}{2} (X_n + N/X_n)$ to calculate the square root of N . Hence find the square root of 5 correct to 4 decimal places.
10. Compute the real root of $x \log_{10} x - 1.2 = 0$ correct to 5 decimal places.
11. Solve the following equations by Gauss-Jacobi method.

$$\begin{aligned}27x + 6y - z &= 85 \\6x + 15y + 2z &= 72 \\x + y + 54z &= 110.\end{aligned}$$

12. Apply the fourth order Runge-Kutta method, to find an approximate value of y when $X = 0.2$, given that $y' = x + y$, $y(0) = 1$.
13. Using the Predictor-Corrector equations, evaluate $Y(1.4)$ if y satisfies $dy/dx + y/x = 1/x^2$ and $Y(1) = 1$, $Y(1.1) = 0.996$, $Y(1.2) = 0.986$, $Y(1.3) = 0.972$.