Department of Computer Science & Engineering
Motilal Nehru National Institute of Technology, Allahabad

Mid Sem. Examination (EVEN-Semester) 2018

Class:B.Tech.(VI) Sem.(Computer Sc.&Engg. AND I.T.) 2017-18

M.M. : 20 **Subject:** Scientific Computing (Code:CS-1602) M. Hrs: One & Half

Note: **1.ALL Questions are compulsory.**
2.Attempt ALL questions serially starting from Question No.1.
3.Write ALL parts of a question together NOT here & there.
4.Write to the point. Make & State necessary assumptions, if any.

Q.No.1 How can we find an INITIAL approximation to the ROOT of f(x)=0? (01)

Q.No.2 Locate the intervals which contain positive real roots of the equation $x^3 - 3x + 1 = 0$. Find the **FIRST real root** correct to three decimal places, using the Method of False-Position. (03)

Q.No.3 (a) Derive **Newton-Raphson method** for non-linear equation. Why it is also called Chord Method?

(b) When does the Newton- Raphson method fail? (02+01=03)

Q.No.4 Derive the **Newtons Method** for finding **(1 / N)** , where N>0. Hence, find 1/17, using the initial approximation as (i) 0.05 (ii) 0.15. **Do the iterations Converge**?Justify. (02+02=04)

Q.No.5: The following values of the function **f(x) = sin x + cos x**, are given-

x	10^0	20^0	30^0
f(x)	1.1585	1.2817	1.3660

Construct the quadratic **Lagrange interpolating polynomial** that fits the above data. Hence, find **f(π/12).** Compare with the exact value. (05)

Q.No.6: For the following data , Calculate the differences & obtain the Newtons forward and Backward difference Interpolation Polynomials. **Are these Polynomials different? Justify YOUR reply.** Interpolate at x=0.25. (04)

X	0.1	0.2	0.3	0.4	0.5
f(x)	1.40	1.56	1.76	2.00	2.28

* All the Best *