RAN-2403000503013001

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S.Y.B.Sc. (Sem. III) (NCF-NEP) Examination March - 2025

MH-MJ1-301-Mathematics Paper-V Theory

Numerical Methods-I

Time: 1 Hours] **[Total Marks: 25**

સૂચના : / Instructions

(૧) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **S.Y.B.Sc. (Sem. III) (NCF-NEP)**

Name of the Subject :

☛ **MH-MJ1-301-Mathematics Paper-V Theory Numerical Methods-I**

Subject Code No.: **2403000503013001**

Seat No.:

Student's Signature

(2) All questions are compulsory.

(3) Figures to the right indicate full marks of the question.

(4) Follow usual notations.

Q-1. Answer any Five from the followings **05**

1. Write the condition for any function $f(x)$ has at least one root between a and b.
2. Give an example of Algebraic equation.
3. Write name of the three methods to find the root of the Algebraic or Transcendental equation.
4. Define the operator δ, E and E^{-1}.
5. Prove that $\delta^2 E = \Delta^2$.
6. Write the Newton's forward difference interpolation formula.

Q-2. Answer any Two from the followings. 10

1. Explain False Position method.
2. Explain Iteration method.
3. Using Newton-Raphson method, find a real root, correct to 3 decimal places, of the equation $\sin x = \frac{x}{2}$, given that the root lies between $\frac{\pi}{2}$ and π.

Q-3. Answer any Two from the followings. 10

1. Explain Forward differences.
2. The table below gives the values of tan x for $0.10 \leq x \leq 0.30$:

x	$y = \tan x$
0.10	0.1003
0.15	0.1511
0.20	0.2027
0.25	0.2553
0.30	0.3093

   Final the value of tan 0.12

3. Prove the following relations:

   a) $\Delta = \mu\delta + \frac{\delta^2}{2}$ b) $\Delta^3 y_2 = \nabla^3 y_5$