

RAN-2403000503013001
S.Y.B.Sc. Mathematics (Sem.-III) Examination November - 2025
Major-1-Mathematics Paper-V Theory (MH-MJ1-301)
Numerical Methods-I
[Total Marks: 25
સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book

Seat No.:

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Student's Signature

Q.1. Answer any five from the followings.
5

1. If $f(a) \cdot f(b) < 0$ in Bisection Method, what does it indicate?
2. Write the formula for the False Position Method.
3. What is the necessary condition for convergence in the iteration method?
4. Define shift operator and averaging operator.
5. If the third forward difference is zero, what is the degree of polynomial?
6. Write the relation between backward difference operator ∇ and shift operator E .

Q.2. Answer any two from the followings.
10

1. Explain False Position Method.
2. Find a real root of the equation $e^x - 3x = 0$ using Newton-Raphson method correct up to three decimal places (take initial approximation $x_0 = 0.5$).
3. Use the Bisection method and find a real root of the equation $\cos x = x$ correct up to two decimal places.

Q.3. Answer any two from the followings.
10

1. Derive the Newton's forward difference interpolation formula.
2. Prove the following.

$$\text{i. } \mu\delta = \frac{\Delta + \nabla}{2} \qquad \text{ii. } 1 + \mu^2\delta^2 = \left(1 + \frac{\delta^2}{2}\right)^2$$

3. Find the missing term in the following table.

x	0	1	2	3	4
y	2	4	—	16	32