

RAN-2403000503013001
S.Y.B.Sc. Mathematics (Sem.–III) Examination March - 2026
MH-MJ1-301-Major Mathematics Paper-V Theory Numerical Methods-I
Time: 1 Hour]
[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 following.
05

1. Give the formula for the midpoint in the Bisection Method.
2. If $f'(x) = 0$ at an iteration in Newton-Raphson method, what will happen?
3. Write the iterative formula for iteration method.
4. Define central difference operator and shift operator.
5. When is Newton's forward difference interpolation formula typically used?
6. If the second backward difference is zero, what is the degree of polynomial?

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

1. Explain Iteration Method by finding a real root of the equation $x^3 + x^2 - 1 = 0$ correct up to two decimal places.
2. Use the Bisection method and find a real root of the equation $x^3 - 4x + 1 = 0$ correct up to two decimal places.
3. Use the False position method and find a real root of the equation $\cos x = x$ correct up to three decimal places.

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

1. Find a polynomial that takes the following values and hence compute y at $x = 2.5$

x	1	2	3	4	5
y	2	5	10	17	26

2. Derive the Newton's backward difference interpolation formula.

3. Show that $e^x \left(u_0 + x\Delta u_0 + \frac{x^2}{2!} \Delta^2 u_0 + \dots \right) = u_0 + u_1 x + u_2 \frac{x^2}{2!} + \dots$