



RAN-2503000505043001

T.Y.B.Sc Mathematics (Sem. - V) Examination October - 2025

Minor-1-Numerical Methods-I Theory (MH-ME-501)

Time: 2 Hours]
[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) Define Algebraic Equation.
- 2) Write the iterative formula of the False position method.
- 3) If $f(a) \cdot f(b) > 0$, can we apply the Bisection method? (Yes / No)
- 4) Prove that $\nabla = 1 - E^{-1}$.
- 5) Write δy_1 in terms of y_1 and y_0 .
- 6) If $\nabla y_2 = 4$, $\nabla y_3 = 6$, what is the value of $\nabla^2 y_3$?

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

- 1) Explain False position Method.
- 2) Use the Bisection method and find a real root of the equation $x^3 + x - 1 = 0$, correct to two decimal places.
- 3) Find a real root of the equation $2x = \cos x + 3$ using Newton-Raphson method correct up to four decimal places (take initial approximation $x_0 = 1.5$).

Q. 3 Answer any two from the following.
(10)

- 1) Using the method of separation of symbols, show that,

$$\nabla^n u_{x-n} = u_x - nu_{x-1} + \frac{n(n-1)}{2}u_{x-2} + \dots + (-1)^n u_{x-n}$$

- 2) Explain Backward differences.
- 3) Use Newton's Forward Interpolation Formula to estimate y when $x = 1.5$ from the following data.

x	0	1	2	3
y	1	2	9	27