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T.Y.B.Sc. Mathematics (Sem.-V) Examination March - 2026

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

[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.:

Student's Signature

Q.1. Answer any five from the following. **05**

1. Define Transcendental Equation.
2. Does Newton-Raphson method always converge? (Yes / No)
3. What condition ensures convergence in the Iteration Method?
4. Prove that $\Delta = E - 1$.
5. if $\Delta y_0 = 5$, $\Delta y_1 = 7$, what is the value of $\Delta^2 y_0$?
6. Write the relation between D and E.

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

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

Q.3. Answer any two from the following. **10**

1. Explain Forward differences.
2. Find a polynomial that takes the following values.

x	2	4	6	8	10	12
y	4	8	14	22	34	50

And hence compute y at $x = 7$

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