

M.SC. MATHEMATICS
FIRST SEMESTER
NUMERICAL ANALYSIS
MSM-104 IDM_n [SPECIAL REPEAT]
[USE OMR FOR OBJECTIVE PART]

**SET
A**

Duration: 1:30 hrs.

Full Marks: 35

Time: 15 mins.

(PART-A: Objective)

Marks: 10

Choose the correct answer from the following:

1X10=10

- Order of Convergence in Newton Raphson's method is
 - 2
 - 3
 - 0
 - None
- The Newton Raphson's algorithm for find the cube root of N is
 - $x_{n+1} = \frac{1}{3}(2x_n + \frac{N}{x_n^2})$
 - $x_{n+1} = \frac{1}{3}(x_n + \frac{N}{x_n^2})$
 - $x_{n+1} = \frac{1}{3}(2x_n + \frac{1}{Nx_n^2})$
 - None of the above
- In the case of Bisection method the convergence is
 - Linear
 - Quadratic
 - Very Slow
 - None of the above
- The Newton Raphson's method fails if
 - $f'(x)$ is negative
 - $f'(x)$ is too large
 - $f'(x)$ is zero
 - None of these
- The Newton Raphson's algorithm for find the cube root of $\frac{1}{N}$ is
 - $x_{n+1} = x_n(2 + Nx_n)$
 - $x_{n+1} = x_n(2 - Nx_n)$
 - $x_{n+1} = x_n(1 - Nx_n)$
 - None of these
- A matrix is a symmetric then
 - $A = -A^1$
 - $A = A^1 + A$
 - $A = A^1$
 - None
- A square matrix can be written as
 - $A = \frac{1}{2}(A + A^1) + \frac{1}{2}(A - A^1)$
 - $A = \frac{1}{2}(A + A^1) - \frac{1}{2}(A - A^1)$
 - $A = \frac{1}{2}(A + A^1)$
 - All of these

8. which one of the following is correct

a. $(AB)^1 = A^1 B^1$

c. $(AB)^1 = AB$

b. $(AB)^1 = B^1 A^1$

d. All of these

9. A matrix is a skew symmetric then

a. $A = -A^1$

c. $A = A^1$

b. $A = A^1 + A$

d. None

10. The Newton Raphson's algorithm for find the cube root of \sqrt{N} is

a. $x_{n+1} = \frac{1}{2} \left(x_n - \frac{N}{x_n} \right)$

c. $x_{n+1} = \frac{1}{2} \left(x_n + \frac{N}{x_n} \right)$

b. $x_{n+1} = \frac{1}{2} \left(x_n + \frac{1}{N x_n} \right)$

d. None of these

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(Descriptive)

Time : 1 hr. 15 mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

1. Evaluate the formula to find $\sqrt[k]{N}$ of x_{n+1} 5

2. a. Evaluate the iterative formula by using Newton Raphson method of cube root of 17 to the three decimal places. 5+5=10
b. Find a real of the equation $x \log_{10} x = 1.2$ by Regula- Falsi method correct to four decimal places.

3. a. Apply Gauss elimination method to solve the equations 5+5=10
$$\begin{aligned} x + 4y - z &= -5 \\ x + y - 6z &= -12 \\ 3x - y - z &= 4 \end{aligned}$$

b. Apply Gauss -Jordan method to solve the equations
$$\begin{aligned} x + y + z &= 9 \\ 2x - 3y + 4z &= 13 \\ 3x + 4y + 5z &= 40 \end{aligned}$$

4. Apply Factorization or LU method to solve the equations 10
$$\begin{aligned} 3x + 2y + 7z &= 4 \\ 2x + 3y + z &= 5 \\ 3x + 4y + z &= 7 \end{aligned}$$

5. Find an approximate root of the equation $x^3 - 2x - 5 = 0$, using the method of false position correct to three decimal places. 10

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