REV-01
MSM/32/37

2023/12

SET A

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

Duration: 1:30 hrs. **Full Marks: 35**

[PART-A: Objective]

Time: 15 mins. **Marks: 10**

Choose the correct answer from the following: ***1X10=10***

1. Order of Convergence in Newton Raphson's method is
   a. 2 b. 3
   c. 0 d. None

2. The Newton Raphson's algorithm for find the cube root of N is
   a. $x_{n+1} = \frac{1}{3}(2x_n + \frac{N}{X_n{}^2})$ b. $x_{n+1} = \frac{1}{3}(x_n + \frac{N}{X_n{}^2})$
   c. $x_{n+1} = \frac{1}{3}(2x_n + \frac{1}{NX_n{}^2})$ d. None of the above

3. In the case of Bisection method the convergence is
   a. Linear b. Quadratic
   c. Very Slow d. None of the above

4. The Newton Raphson's method fails if
   a. $f^1(x)$ is negative b. $f^1(x)$ is too large
   c. $f^1(x)$ is zero d. None of these

5. The Newton Raphson's algorithm for find the cube root of $\frac{1}{N}$ is
   a. $x_{n+1} = x_n(2 + Nx_n)$ b. $x_{n+1} = x_n(2 - Nx_n)$
   c. $x_{n+1} = x_n(1 - Nx_n)$ d. None of these

6. A matrix is a symmetric then
   a. $A = -A^1$ b. $A = A^1 + A$
   c. $A = A^1$ d. None

7. A square matrix can be written as
   a. $A = \frac{1}{2}(A + A^1) + \frac{1}{2}(A - A^1)$ b. $A = \frac{1}{2}(A + A^1) - \frac{1}{2}(A - A^1)$
   c. $A = \frac{1}{2}(A + A^1)$ d. All of these

8. which one of the following is correct

a.	$(AB)^1 = A^1B^1$	b.	$(AB)^1 = B^1A^1$
c.	$(AB)^1 = AB$	d.	All of these

9. A matrix is a skew symmetric then

a.	$A = -A^1$	b.	$A = A^1 + A$
c.	$A = A^1$	d.	None

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

a.	$x_{n+1} = \frac{1}{2}(x_n - \frac{N}{X_n})$	b.	$x_{n+1} = \frac{1}{2}(x_n + \frac{1}{NX_n})$
c.	$x_{n+1} = \frac{1}{2}(x_n + \frac{N}{X_n})$	d.	None of these

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**

$$x + 4y - z = -5$$
$$x + y - 6z = -12$$
$$3x - y - z = 4$$

   b. Apply Gauss –Jordan method to solve the equations

$$x + y + z = 9$$
$$2x - 3y + 4z = 13$$
$$3x + 4y + 5z = 40$$

4. Apply Factorization or LU method to solve the equations **10**

$$3x + 2y + 7z = 4$$
$$2x + 3y + z = 5$$
$$3x + 4y + z = 7$$

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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