Mohammad Ali Jinnah University
Live, Learn and Be Inspired

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| ***Mohammad Ali Jinnah University (MAJU)*** | | |
| ***Course: Numerical Computing*** | | |
| ***Faculty: Muhammad Ubaid Zaman*** | **Due Date** | **03-May-25** |
| ***Class ID: MT3410-SP25-BS(CS)-FA20-BM*** | ***Total Marks:*** | **12** |
| ***Assignment # 2*** | ***Date: 21-April-2025*** | |

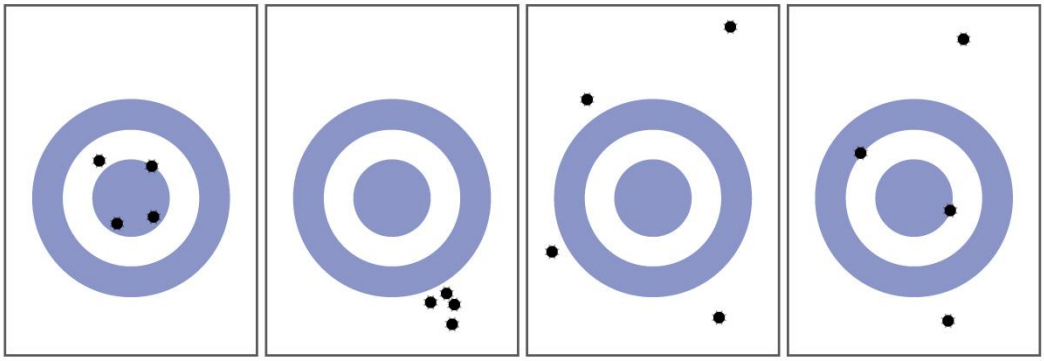
Student Name: _____ Student ID: _____

INSTRUCTIONS:

- Attempt all answers in sequence
- Start each answer on a separate page
- Plagiarism and late submission will lead to ZERO marks.
- Submit hard copy and scan copy both.
- Hand written solution is acceptable.
- Solve your assignment on A4 size paper only. No other type of paper will be accepted.

## Question: 1

Four players are competing in the final round of an archery competition. The following picture shows their targeted results. Compute their performance based on accuracy and precision. Out of these four, which player performance will you recommend as a winner and why? Comment.



Archer W Archer X Archer Y Archer Z

## Question: 2

Faizan, while working on his class project designed a mathematical that involves a true value of $\sqrt{5} = 2.2360679775$ but his mathematical model is limited **(approximate)** to four decimal positions only with applying the concept of rounding off **(also to four decimal positions)**. Find out the following.

**a)** True error
**b)** True percent relative error.

## Question: 3

Find the value of $e^x$ by Maclaurin series, where x = 0.7. Find out the error criterion that ensures a result is correct to at least 4 significant figures **(Using Scarborough Principle).**

## Question: 4

Determine the number of terms necessary to approximate function $f(x) = \cos x$ to 3 significant figures using the Maclaurin series approximation as mentioned below.

$$\boldsymbol{\cos x = 1 - \frac{x^2}{2} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \cdots \ldots \ldots \ldots}$$

Calculate the approximation using the value of x = 0.3π

## Question: 5

Use Newton's method and Secant method to find solutions accurate to within $10^{-4}$ for the following problems.

a. $x^3 - 2x^2 - 5 = 0$, [1, 4]

b. $x^3 + 3x^2 - 1 = 0$, [−3, −2]

c. $x - \cos x = 0$, [0, π/2]

d. $x - 0.8 - 0.2 \sin x = 0$, [0, π/2]