

CEME, National University of Sciences & Technology

1st OHT Spring Semester 2018

Dept. of Basic Sciences & Humanities

Subject Code: MATH-161

Subject: Discrete Mathematics

Degree: 37 ME A,B

Duration: 1 hour

Date: 12-03-2018 (12:00-13:00)

Max Marks: 50

Instructor: Dr. Syed Tayyab Hussain

Note: No queries will be entertained. Attempt all parts of a question in sequence, Q 1-3 are based on CLO 1/ PLO 2, Q4 is based on CLO 2/PLO 2

Q1: Define the difference between accuracy and precision. Let the ball of mass $\frac{22}{7} kg$ is moving with acceleration $\frac{7}{11} m/sec^2$. Find the force used to drive the ball using the five decimal rounding and chopping. Calculate the relative and absolute errors in the calculated values (using rounding and chopping in normalized form). [10]

Q2: A point where the function has its maximum value is found when derivative of the function equals zero. Keeping this in mind, find the angle for which range R of a projectile is maximum. We know that if a projectile is fired with an initial velocity v_0 at an angle α with the horizontal axis, the Range is given by $R = \frac{v_0^2}{g} \sin 2\alpha$; $0 \leq \alpha \leq \frac{\pi}{2}$, where g is the downward acceleration due to the gravity. Assume $g = 10 \text{ units}$ and $v_0 = 100 \text{ units}$ (Use Secant Method to find correct answer upto three decimal points in normalized form) [15]

Q3: Using Newton Raphson method calculate the value of $\sqrt{3}$ by constructing an equation in terms of x, take the initial guess value $x_0 = 1$, Find the answer correct to four decimal points in normalized form. [10]

Q4: A sensor measures the position f(t) of a particle t microseconds after a collision as given in the table [8+7]

t	3	5	10	12
f(t)	3	8	14	16

Use Lagrange and Newton's Divided Interpolation Polynomial to estimate value of f(6).

****Good luck****