

Assignment 1  
Subject: Mathematics  
3<sup>rd</sup> Semester (MAJOR)  
Paper: MAT-SE-3014  
(Computer Algebra Systems and Related Software)

Full Marks: 25

**Instruction:** After completing your assignment, save it as a pdf and name it as “NAME\_RollNo\_SE\_3014(A1)\_major” and then mail it to [mathematics.adp.2021@gmail.com](mailto:mathematics.adp.2021@gmail.com) . Here, type your name and roll no in the place of NAME and RollNo while naming the file.

**1. Answer the following questions:**

**2 x 5 = 10**

- a. What is Computer Algebra System (CAS)? Give one example of CAS.
- b. Who created Mathematica? When Mathematica was released?
- c. What is the use of the command  $\mathbf{N}[\_, \_]$  in mathematica? Give one example using this command in mathematica.
- d. Write the mathematica command to find the value of  $\sin\left(\frac{\pi}{2}\right)$ ,  $\log_{10} 5$ ,  $\sum_{i=1}^{50} i^3$   
and  $\prod_{i=1}^{50} i^5$  .
- e. Write the mathematica command to find the factors of a given integer.

**2. Answer the following questions:**

**5 x 3 = 15**

- a. Write the mathematica command to find the first 500 prime numbers. Write the command to find the 999<sup>th</sup> prime number. Write the command to find the value of pi and  $2^{\sqrt{2}}$  upto 200 decimal and 100 decimal places respectively.

- b. Write mathematica command to find the value of  $\sin(60)$ ,  $\cos(90)$ ,  $\tan(45)$ ,  $\cos^{-1}(0.001)$ ,  $\sin^{-1}(1)$  and  $\operatorname{cosec}^{-1}(-0.001)$ . Write mathematica

command to solve  $489 \div (989 \times 786 + 4)$  and  $\sqrt{\sqrt{\sqrt{\sqrt{4 + \sqrt[4]{26}}}}}$ .

- c. Write the mathematica command to find the prime factors of 5061276073984. Also, write the command to factorize  $(x^{99}-1)$  and  $(x^{9973}-1)$ . Define the function  $f(x) = x^{26} + x^4 + 4x + 26$  in mathematica and then find the value of  $f(4)$  and  $f(26)$ .

Assignment 2  
Subject: Mathematics  
3<sup>rd</sup> Semester (MAJOR)  
Paper: MAT-SE-3014  
(Computer Algebra Systems and Related Software)

Full Marks: 25

**Instruction:** After completing your assignment, save it as a pdf and name it as “NAME\_RollNo\_SE\_3014(A2)\_major” and then mail it to [mathematics.adp.2021@gmail.com](mailto:mathematics.adp.2021@gmail.com) . Here, type your name and roll no in the place of NAME and RollNo while naming the file.

**1. Answer the following questions:**

**2 x 5 = 10**

- a. What is the use of `?f` in mathematica? Give an example to support your answer.
- b. What is the use of the mathematica command `Clear[ ]` and `Plot[ ]` ?
- c. Find the value of  $e$  upto 100 decimal places. Also, write the command used to find the decimal values.
- d. Write four in-built mathematica commands. Also, use those commands to give examples.
- e. Write the first 20 Natural numbers in a list using mathematica command. Then, write the first 20 positive even numbers in a list using mathematica command.

**2. Answer the following questions:**

**5 x 3 = 15**

- a. Write mathematica command to plot the graphs of  $\sin(x)$  ,  $\cos(x)$  and  $\tan(x)$  in the interval  $[0,20]$  separately. Also write a mathematica command to plot the above graphs in the same plane in the interval  $[-10,10]$ .

- b. Write mathematica command to find the value of  $\tan(60)$  ,  $\sin(90)$  ,  $\sec(45)$ ,  $\operatorname{cosec}^{-1}(0.001)$  ,  $\cos^{-1}(1)$  and  $\cot^{-1}(-0.001)$  . Write mathematica command to solve  $426 \div (2612 \times 409 + 264)$  and

$$\sqrt{\sqrt{\sqrt{\sqrt{26 + \sqrt[26]{4}}}}}$$

- c. Write the mathematica command to enter a value of natural number greater than 15 (say, n). Write mathematica commands to plot the graphs of  $x$  ,  $x^2$  ,  $x^3$  , ..... upto  $x^n$  in the interval  $[0,1]$  on the same plane. Then, write mathematica commands to plot the graphs of  $1/x$  ,  $1/x^2$  ,  $1/x^3$  , ..... upto  $1/x^n$  in the interval  $[0,1]$  on the same plane.