2024
Skill Enhancement Course
PROGAMMING IN MATHEMATICA
Paper Code : SEC0301403
Time : 1 Hour 30 Minutes
Full Marks : 30

(The figures in the margin indicate the full marks for the questions)

1. Answer the following questions :   1×5=5
   a) What is the full form of CAS?
   b) Give two examples of CAS.
   c) Define CAS.
   d) Write five inbuilt functions of mathematica.
   e. Can mathematica be used to plot complex numbers?

2. Answer *any five* of the following questions :   2×5=10
   a) Write the command to add two matrices and then find the sum and product of those two matrices.
   b) Write two Plotting Options for the Plot command along with their uses.
   c) Write the command to input the matrix.
   $$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$
   d) Write the command to plot the function
   $$f(x) = x \text{ for } [-5, 5].$$
   e) Write the inbuilt functions for modulus and square-root in Mathematica.
   f) Write the command to input the zero matrix and identity matrix of order 100×100.

g) Write the command to input and random matrix of order 3×3.

h) Write two differences between Plot and Plot 3D command.

i) What is the use of Manipulate command?

j) What is the use of Mesh option and Plotting Style option in Plot Command?

3. Answer *any three* of the following : $5 \times 3 = 15$

a) Write the command to plot any 2D function of your choice with the color red.

b) Write the command to plot three 2D functions of your choice with three different colours. Also add some grid lines in the graph.

c) Write the command to plot three graphs $f(x)=x$, $g(x)=x^2$ and $h(x) = x^3$ in three different planes where $f(x)$ and $g(x)$ are placed side by side and $h(x)$ is below $f(x)$.

d) Write the command to plot three graphs $f(x) = \sin(x)$, $g(x) = \cos(x^2)$ and $h(x) = \tan(x^3)$ in three different planes.

e) Write the command to plot $x^2 + 4y^2 = 64$ and a sphere of radius 5 in two different planes.

f) Write the command to plot $x^2 + 4y^2 = 64$ in a plane with colour red and both the axes of the planes have arrows.

g) Write the command to plot $f(x) = x$, $g(x) = x^2$ and $h(x) = x^3$ in a plane with colour red, blue and green and stating which graph is identified by which colour.

--- X ---