(b) Extract rows and columns of 'y', find the mean and standard deviation of each row.

(c) Covert matrix 'y' into data frame.

(d) Find mean of the vector "Row 3" of the converted data frame.

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2875 **H**

Unique Paper Code : 32353401

Name of the Paper : SEC 2 – Computer Algebra Systems and Related Softwares

Name of the Course : **CBCS-LOCF – B.Sc. (H) Mathematics**

Semester : IV

Duration : 2 Hours Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. This question paper has **four** questions in all.
3. **All** questions are compulsory.
4. Use anyone of the CAS := Mathematica/Maple/ Maxima/any other to answer the questions.

1. Attempt both parts (i) and (ii).

(i) Fill in the blanks : (1×5=5)

(a) The line numbers assigns to the output as _____ .

(b) To clear the variables, use the command _____ .

(c) The command to calculate the constant e to 100 decimal places is _____ .

(d) % is used for _____ .

(e) The command to calculate the factor of 346849 is _____ .

(ii) Explain any **FIVE** of the following 'R' commands in short : (1×5=5)

(a) qqline()

(b) stack()

(c) objects()

(b) Generate a five number summary of d.

(c) Find Mean of d.

(d) Create a box plot for d.

(iv) Consider the following matrix 'y'

	C1	C2	C3	C4	C5
R1	24	15	53	28	1
R2	5	7	35	55	9
R3	19	9	1	6	17
R4	10	14	56	3	32
R5	23	2	12	45	5
R6	34	18	9	3	18

Write possible R commands for the following questions :

(a) Change row name "R3" to "Row3" of matrix 'y'.

(a) Draw scatter plot of datapoints (D1, D2).

(b) Create dataframe of the above data.

(c) Convert the dataframe into matrix

(ii) Write code of the following in software- R :

(a) Create a vector

y: 5, 8, 13, 20, NA, -3, 0, NA, 15,-31

(b) Find the length of the vector y.

(c) Find Mean of y by dropping NA.

(d) Find the quartile of vector y.

(iii) Write code of the following in software- R:

(a) Create the following dataframe 'd'

6	8	4	9	5	3
4	7	2	1	8	9
3	5	6	8	2	1

(d) remove()

(e) as.factor()

(f) head()

2. Write a short note on any **four** from the following : (2×4=8)

(i) How to create a two-dimensional display of the data with headings in any CAS.

(ii) How to display two graphs side by side in any of the CAS.

(iii) How to define a function of two or more variables in any CAS. Give an example of the input of such definition.

(iv) How to plot a 3-dimensional parametric curve. Explain with an example.

(v) How to form a new matrix from two existing matrices of same order by stacking them side by side in any CAS.

(vi) In any of the CAS how to create a specified ordered matrix with all the nonzero entries at the specified positions and rest entries are zero.

3. Do any **four** from the following : (2×4=8)

(i) Write command for solving the system of equations :

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

$$x + y + z = 2;$$

$$4x + 2y - z = 1$$

(ii) Write command for sketching the curve:

$$y^2 = 4ax \text{ for } 0 \leq x \leq 5$$

The colour of the curve is red.

(iii) Write the command for plotting the graph of

$$\sin(x^2 + y^2)\, e^{-x^2} + \cos(x^2 + y^2),\ 0 \leq x \leq 2,\ 0 \leq y \leq 2.$$

(iv) Write the output of the following commands in the statistical software 'R'


```
>response=c(5,6,9,12,8,7,9,13,10)
>predictor=c(rep('open',5),rep('closed',4))
>res_pre=data.frame(response,predictor)
>res_pre
>res_pre_m=as.matrix(res_pre)
```

(v) $A = \begin{bmatrix} 1 & 5 & 6 \\ 4 & 9 & 0 \\ 1 & 2 & 1 \end{bmatrix}$

Write commands for generating the above matrix and finding its transpose.

4. Attempt any **three** parts from the following : (4×3=12)

(i) Consider two data sets :

D1: 13, 14,21, 18, 5, 24, 10

D2: 10, 12, 18, 9, 11,26, 15

Write code of the following in software- R: