STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600086

# BRANCH I - MATHEMATICS 

FIFTH SEMESTER
COURSE : INTERDISCIPLINARY CORE
PAPER : MATHEMATICS THROUGH SCIENTIFIC SOFTWARE

## SUBJECT CODE : 19ID/IC/MS55

TIME : 3 HOURS
MAX. MARKS: 100

## SECTION -A

## ANSWER ALL THE QUESTIONS:

1. In MATHCAD the range variables are defined by typing $\qquad$ between the first value and last value.
a) colon (:)
c) semi colon (;)
b) comma (,)
d) period (.)
2. To view the built-in functions in MATHCAD, select Functions from $\qquad$ menu.
a) FILE
c) EDIT
b) INSERT
d) MATH
3. In MATHCAD, part of a name can be a subscript by pressing $\qquad$
a) comma (,)
c) period (.)
b) underscore (
d) none
4. In MATHCAD, the middle placeholders on each of the axes are to hold $\qquad$
a) range values
c) $f(x)$
b) numeric values
d) arguments
5. In Box plot notch is a $\qquad$ value.
a) numeric value
c) logical value
b) character value
d) None of the above
6. In $\boldsymbol{R}$, the hist( ) function takes $\qquad$ as the primary input.
a) variable
c) value
b) vector
d) None of the above
7. In $\boldsymbol{R}$, the members must all be vectors of equal length for $\qquad$ .
a) List
c) Factors
b) Arrays
d) Data frame
8. In $\boldsymbol{R}$, the command $B \leftarrow$ matrix $(c(1,2,3,4,5))$ will produce $\qquad$
a) one column
c) one row
b) warning message
d) error message
9. The $\qquad$ is also called as the $50^{\text {th }}$ percentile.
a) mean
c) median
b) mode
d) All of the above
10. The correlation results can be viewed using the $\qquad$ function in $\boldsymbol{R}$.
a) $\operatorname{corrplot}()$
c) $\operatorname{Corrplot}()$
b) corr. $\cdot \operatorname{plot}()$
d) $\operatorname{Corr} . p l o t()$
11. A relationship model in $\boldsymbol{R}$ is created using $\qquad$
a) $\operatorname{lmd}()$
c) rm()
b) im()
d) None of the above
12. In $\boldsymbol{R}$, this function generates required number of random values of given probability from a given sample.
a) qbinorm()
c) qbinom()
b) rbinorm()
d) rbinom()
13. Which of the following Excel charts represents only one value for each variable?
a) Bar
c) Pie
b) Line
d) Column
14. A formula in Excel always begins with an $\qquad$ .
a) Equal sign
c) Colon
b) Comma
d) Space
15. Which of the following identifies a cell in Excel?
a) Address
c) Formula
b) Name
d) Label
16. Which function displays row data in a column or column data in a row?
a) Rows
c) Transpose
b) Hyperlink
d) Index
17. A $\qquad$ lets to hide/reveal parts of a layer.
a) Alpha Channel
c) Layer Mask
b) Layer Mask
d) Light \& Shadow Filter
18. The image loses its quality by being $\qquad$
a) Merged
c) Scaled
b) Renamed
d) Masked
19. $\qquad$ tool takes color in passing and uses it to mix to the next color it meets.
a) Smudge
c) Patch
b) Heal
d) Dodge
20. 

a) T
c) $\mathrm{Ctrl}+\mathrm{T}$
b) Alt +T
d) $\operatorname{Shift}+T$

## COURSE : INTERDISCIPLINARY CORE <br> PAPER : MATHEMATICS THROUGH SCIENTIFIC SOFTWARE <br> SUBJECT CODE : 19ID/IC/MS55 <br> SECTION -B

TIME : 3 HOURS MAX.MARKS: 100

## ANSWER ANY FOUR QUESTIONS

$(4 \times 20=80)$

1. a) Draw the multiple $x-y$ plot for the functions $f(x)=2 x+1, g(x)=\sin (x)$.
b) Solve the given system of linear equations

$$
\begin{aligned}
& 10 x+2 y+z=9 \\
& x+10 y-z=-22 \\
& -2 x+3 y+10 z=22
\end{aligned}
$$

c) Use symbolic computation to find the inverse, transpose and determinant for the

$$
\operatorname{matrix}\left(\begin{array}{ccc}
A & B & C  \tag{4marks}\\
D & E & F \\
G & H & I
\end{array}\right)
$$

d) Solve $x \sin (x)-e^{x}+\log x=0, \prod_{n=1}^{10} a . k^{n}, \sum_{i=3}^{10} \frac{(-1)^{i+1}}{i}$
2. a) In $\boldsymbol{R}$, create a $5 \times 3$ matrix representing the marks of 3 students in 5 subjects and depict it using a multiple bar diagram.
b) Create a data frame for the number of students who are campus recruited in the four IT companies - IBM, Cognizant, TCS and Infosys in the last 7 years and represent it by a multiple line plot using different colours, give labels, heading and a key.
c) In $\boldsymbol{R}$, create a numeric vector with values ranging from 50 to 90 using the sequence operator, identify the number which are divisible by 5 and print the results. ( 5 marks)
3. a) Analyze the following pairs of data sets, such as its mean, variance, correlation (between $X_{i}$ and $Y_{i}, i=1,2$ ), scatter plot ( $X_{i}$ versus $Y_{i}, i=1,2$ ) and infer the relationship between the two variables.

| $\boldsymbol{X}_{\boldsymbol{I}}$ | $\boldsymbol{Y}_{\boldsymbol{I}}$ | $\boldsymbol{X}_{\mathbf{2}}$ | $\boldsymbol{Y}_{\mathbf{2}}$ |
| :---: | :---: | :---: | :---: |
| 10 | 8.04 | 10 | 9.14 |
| 8 | 6.95 | 8 | 8.14 |
| 13 | 7.58 | 13 | 8.74 |
| 9 | 8.81 | 9 | 8.77 |
| 11 | 8.33 | 11 | 9.26 |
| 14 | 9.96 | 14 | 8.1 |
| 6 | 7.24 | 6 | 6.13 |
| 4 | 4.26 | 4 | 3.1 |
| 12 | 10.84 | 12 | 9.13 |
| 7 | 4.82 | 7 | 7.26 |
| 5 | 5.68 | 5 | 4.78 |

(15 marks)
b) Illustrate the application of $\operatorname{dbinom}()$ and pbinom() using suitable values in $\boldsymbol{R}$.
( 5 marks)
4. Create an excel sheet that contains 15 students record with the data fields Consumer No, Name, Jewels, No of grams, Wastage, Net amount.
(10 marks)
Select Jewels from the list (Chain, Bangles, Ring, Stud).
Wastage $=10 \%$ from the grams purchased.
The gold rate /gram is assumed to be Rs. 5000 .
a) Calculate Subtotal $=$ No_of _grams * gold rate + Wastage
(10 marks)
b) Calculate Netamount $=10 \%$ GST + Subtotal
c) Filter the Bangles record alone
d) Compare various jewels purchased by the customers using Bar chart.
5. a) Create logo "Stella" using the given image.
(10 marks)

b) Create an image on your own and animate the image

