

U.G. 4th Semester Examination - 2020**COMPUTER SCIENCE****[HONOURS]****Skill Enhancement Course (SEC)****Course Code : CMSH/SEC-P-402****[PRACTICAL]**

Full Marks : 50

Time : 4 Hours

Marks Allotment :

Class Attendance and Internal : 10 marks

Semester End Practical : 40 Marks

Experiment : 30 Marks, Viva : 10 Marks

Answer any one question.

1. The Identity Matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the `eye()` function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix $A = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}$ the identity matrix $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is generated. That is $A * B = I$.
2. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).

3. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 1025Hz. Save the sound to a file called "result.wav". Plot the first 200 samples.
4. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.
5. Write a program to input 2 strings from the user and to print out
 - a) concatenation of the two strings with a space between them,
 - b) a line of asterisks the same length as the concatenated strings, and
 - c) reverse the concatenated string.
6. Draw a circle using plot function of Matlab of radius 5.
7. The `sort rows(X)` function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

8. Write a Matlab code to plot the histogram of the sum of five six-sided dice thrown together 100 times. For this problem randomly generate five numbers between 1 and 6 (both inclusive), add them and repeat this step 100 times. Store the results in a vector that would count the number of appearance of each sum value (5 to 30).

9. Draw a graph that joins the points (5,8), (8,8), (5,3) and (8,3).

10. X is a vector with values starting from 0 and ranging upto 3600 with an interval of 0.1. In a single graph plot the equations of $\sin(X)$ and $\cos(X)$.

11. Consider these two polynomials $2a^2 + 3a + 5$ and $5a + 6$. Represent them using Matlab.

Now subtract them and show the result.

12. Print the following pattern using Matlab

```
*
**
***
****
***
**
*
```

13. Write two Matlab functions

a) convert Fahrenheit to Celsius

b) convert Celsius to Fahrenheit

14. Consider the matrix $A = \begin{bmatrix} 1 & 2 & 5 \\ 2 & 1 & 4 \\ 3 & 1 & 4 \end{bmatrix}$. Find A^{-1} .

15. Write a function in Matlab that will draw a circle with a certain radius (given by user) and the center will be at (5,5)

16. Print the following pattern using Matlab

```
*
*      *
*      *      *      *      *      *
```

17. Using Matlab randomly generate two random 100 digit decimal numbers. Store them and add them.

18. Write any sorting function in Matlab. Store that function in **sort.m** file. Write another Matlab code that randomly generates 10 numbers and uses the sort.m file to sort that random list of numbers.

19. Consider these two matrices $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ 5 & 2 \end{bmatrix}$. Find $A \times B$ and $A.B$.
20. Create a text file whose content will be your name. Write a Matlab code to read the text file. Create a $N \times N$ matrix (N is the number of characters of your name). Put your name in the major diagonal.
21. Store some numbers in a spreadsheet in single column. Save the file as 'file.csv'. Read the file through Matlab. Plot the values in any chart you like using Matlab. Find the largest value.
22. Design a program in Matlab that will ask input from user. If user provides any string the program will calculate the number of 'a' in the function. The program will only end if user enters 'quit'.
23. Using Matlab construct a 3×1 column vector naming A. Find A^T and $A \times A^T$.
24. Using Matlab plot $\sin(X)$ for any variable X. Save the plotted file as an image file.
25. Create a Matlab function that will calculate sum of natural numbers. The user must input one positive value. Any unfair value must show error.
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