KARPAGAM ACADEMY OF HIGHER EDUCATION (Deemed to be University) (Established Under Section 3 of UGC Act, 1956)

DEPARTMENT OF CS, CA & IT

SYLLABUS

SUBJECT NAME: PROGRAMMING IN MATLAB – PRACTICAL

SUBJECT CODE: 17CSU314B

SEMESTER: III

CLASS: II BSc CS

Instruction Hours / week: L: 0 T: 0 P: 3 Marks: Int : 40 Ext : 60 Total: 100

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.

a. (3+4)/(5+6)b. $2\Pi^2$ c. $\sqrt{2}$ d. $(0.0000123 + 5.67 \times 10-3) \times 0.4567 \times 10-4$

2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.

3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:

a. 2, 4, 6, 8, 10 b. 1/2, 1, 3/2, 2, 5/2 c. 1, 1/2, 1/3, 1/4, 1/5 d. 1, 1/4, 1/9, 1/16, 1/25

4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3]; while the numbers of each product are [3, 2, 1, 5]. Use MATLAB to calculate the total bill.

5. The sortrows(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.

6. 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=[1 2; -1 0] the identity matrix I=[1 0; 0 1] is generated. That is A*B=I.



7. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the $1,4,9,16,\ldots,\sqrt{N}$ Nth entries, i.e. those numbers which have indices that are square numbers.

8. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).

9. The seeds on a sunflower are distributed according to the formula below. Plot a small circle at each of the first 1000 co-ordinates :

$$r_n = \sqrt{n}$$
$$\theta_n = \frac{137.51}{180}\pi n$$

10. Calculate 10 approximate points from the function y=2x by using the formulae:

i. xn = n

ii. yn = 2n + rand - 0.5

Fit a line of best fit to these points using the function polyfit() with degree=1, and generate coordinates from the line of best fit using polyval(). Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.

11. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called ex35.wav. Plot the first 100 samples.

12. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.

13. 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.

14. Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with: i. FtoC(96)

ii. lookfor Fahrenheit iii. help FtoC

15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:

ii. Enter string 2: Huckvale

iii. Mark Huckvale

iv. **********

v. elavkcuH kraM

i. Enter string 1: Mark