## Nirma University

## Institute of Technology

Semester End Examination, December - 2020

B.Tech., Semester – V(Open Elective) 2ECOE76: MATLAB for Engineers

Roll /	Supervisor's initial
Exam No.	With date
Time: 1.5 Hours	Max. Marks: 40

- Instructions: 1. Attempt all questions.
  - 2. Figure to right indicate full marks.
  - 3. Draw neat sketches wherever necessary.
  - 4. Assume suitable data wherever necessary.
- Write a MATLAB code which generates the following function. Q.1 (05)

$$y(t) = 3t^2 - 2t + 6 \text{ for } t < -5$$
  
=  $4t^2 - 3t + 5 \text{ for } -5 \le t \le 5 \text{ at step size } 1$   
=  $4t + 17 \text{ for } t > 5$ 

OR

Write a MATLAB code which generates the following function. (05)

$$y(2j) = \frac{x(j) + x(j-1)}{2}$$
 and  $y(2j-1) = \frac{x(j) - x(j-1)}{2}$ 

Where the given array x=[2,7,10,5,4,8,7,6,3,14].

Write a MATLAB program that accepts a string from a user with the (05)input function, chops that string into a series of tokens, sorts the

tokens into ascending order, and prints them out.



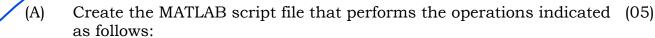
Write a MATLAB program that returns the following plots: (10)

- 1. y1=sin(x) versus x
- 2. y2=cos(x) versus x
- 3. y3=[sin(x)+cos(x)] versus x
- 4. y4=[sin(x)-cos(x)] versus x

over the range  $0 \le x \le 2\pi$  using the following specs:

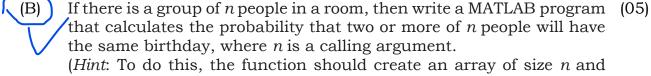
- 1. Twenty points to create each plot
- 2. Label the *x* and *y*-axis
- 3. Choose color, markers, and line style for each curve
- 4. Create the continuous plots in the same figure window with a grid
- 5. Limit the plotting range over  $1.5 \le y \le -2$
- 6. Remove the axis
- √7. Identify each curve by a text string
- 8. Also, plot each curve in an individual subwindow

Create a 3-D plot in MATLAB from a 2-D,  $11 \times 11$  matrix (in the xy plane) having ones along the main diagonals, zeros everywhere else, with the center element having a magnitude of 2. It is desired that the zx planes indicate the magnitudes of the elements position on the xy plane all having triangular shapes.



$$A = \begin{bmatrix} 3e^{(j\pi/3)} & 6\cos\left(\frac{\pi}{6}\right) + i6\sin\left(\frac{\pi}{6}\right) \\ 3 + 4i & 4.23e^{(-i\pi/18)} + 9 \end{bmatrix} \quad B = \begin{bmatrix} 5 - 9j & 5e^{(j(\pi/3 + \pi/5))} \\ (2 - 3j)^{3.3} & \log(6 - 8j) \end{bmatrix}$$

- 1. C = determinant of A
- 2. D = conjugate of A
- 3. E = square of A
- 4. F = A.  $\land B$
- 5. G = Transpose of A



(*Hint*: To do this, the function should create an array of size n and generate n birthdays in the range 1 to 365 randomly. It should then check to see if any of the n birthdays are identical. The function should perform this experiment at least 5000 times and calculate the fraction of those times in which two or more people had the same birthday.)

- (C) Write a MATLAB function that will accept a structure array of student (0s and calculate the final average of each one, assuming that all exams have equal weighting. Add a new field to each array to contain the final average for that student, and return the updated structure to the calling program. Also, calculate and return the final class average.
- (D) Write a MATLAB function that will accept a cell array of strings and (05) sort them into ascending order according to *alphabetical order*. (This implies that you must treat 'A' and 'a' as the same letter.)