ASSIGNMENT-VI

1. Use Simulink to solve the following differential equation for $0 \leq t \leq 10$:

$$\frac{dy}{dt} = 10 \sin t, \quad y(0) = 0$$

2. Simulate a simple RLC series circuit supplied with step input and study the time response with the following parameters: R=1Ω, L=1mH, C=100μF, V=10v. Assume initial conditions to be zero.

3. Solve the following differential equation using Simulink :

$$\frac{dy}{dt} = -10y + f(t)$$

   Where f(t)=2sin4t and initial condition y(0)=1.

4. Construct a Simulink model to simulate a diode-based half wave rectifier circuit . Apply an AC input voltage and observe the resulting DC output voltage.

5. Construct a Simulink model to simulate a diode-based full wave rectifier circuit . Apply an AC input voltage and observe the resulting DC output voltage.

6. Set up a Simulink model for a simple RC Circuit (resistor-capacitor) and simulate its response to a step input voltage. plot the voltage across the resistor and capacitor over time.

7. Build a Simulink model to analyse the transient response of an RL circuit (resistor-inductor) when subjected to a step input voltage. plot the current through the inductor and the voltage across the resistor as function of time.

8. Create a Simulink model to Simulate Ohm's Law. Use a voltage source block to represent a 12v supply and a resistor block with resistance 10 ohms. Measure and display the current flowing through resistor.

9. Develop a Simulink model to generate set of sine and cosine signal of magnitude 10v and 50Hz.

10. Plot a sinusoidal waveform (1v peak and 1rad/s), differentiate it , and observe both the waveforms on scope.

ASSIGNMENT-VII

1. Write a Python program to remove the first occurrence of a specified element from an array.
   Sample Output:
   Original array: array('i', [1, 3, 5, 3, 7, 1, 9, 3])
   Remove the first occurrence of 3 from the said array:
   New array: array('i', [1, 5, 3, 7, 1, 9, 3])

2. Write a Python program to create an array of six integers. Print all members of the array.
   Sample Output:
   10
   20
   30
   40
   50
   60

3. Write a Python program to get the length of an array.
   Sample Output:
   Length of the array is:
   5

4. Write a Python program to get the number of occurrences of a specified element in an array.
   Sample Output:
   Original array: array('i', [1, 3, 5, 3, 7, 9, 3])
   Number of occurrences of the number 3 in the said array: 3

5. Write a Python program to convert radians to degrees.
   Test Data:
   Radian : .52
   Expected Result : 29.781818181818185

6. Write a Python program to calculate the area of the sector.
   Note: A circular sector or circle sector, is the portion of a disk enclosed by two radii and an arc, where the smaller area is known as the minor sector and the larger being the major sector.
   Test Data:
   Radius of a circle : 4
   Angle measure : 45
   Expected Output:
   Sector Area: 6.285714285714286

7. Write a Python program to calculate the difference between the squared sum of the first n natural numbers and the sum of squared first n natural numbers.(default value of number=2).
   Test Data:
   If sum_difference(12)
   Expected Output :
   5434

8. Write python code to plot bar graph.

9. Write python code to plot line graph.

10. Write python code to plot pie chart.

ASSIGNMENT-VIII

1. Write a Python program to construct the following pattern, using a nested for loop.

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

2. Write a Python program to get the Fibonacci series between 0 and 50.
   Note : The Fibonacci Sequence is the series of numbers
   0, 1, 1, 2, 3, 5, 8, 13, 21, ...
   Every next number is found by adding up the two numbers before it.
   Expected Output : 1 1 2 3 5 8 13 21 34

3. Write a Python program to check whether an alphabet is a vowel or consonant.
   Expected Output:

   Input a letter of the alphabet;

   k is a consonant

4. Write a Python function to sum all the numbers in a list.
   Sample List : (8, 2, 3, 0, 7)
   Expected Output : 20

5. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.

6. Write a Python function to find the maximum of three numbers.

7. Write a Python program that calculate voltage. Assume value of R and I.

8. Write a Python program that allows users to calculate the equivalent resistance of a combination of resistors in series.

9. Write a Python program that calculates the effective (RMS) voltage and current of an AC circuit given the peak voltage and frequency.

10. Develop a python program that calculates the output voltage of a voltage of a voltage divider circuit given the values of the two resistors and the input voltage.

11. Develop a python program that calculates the output voltage of a voltage of a voltage divider circuit given the values of the two resistors and the input voltage.

12.

13. Develop a python program that calculates the output voltage of a voltage of a voltage divider circuit given the values of the two resistors and the input voltage.