1- For R-L circuit, the supply voltage of v(t)=10 cos(377t) is applied across a load whose impedance is given by $Z = 2\angle 60^o$. Write a MATLAB script file to determine the current i(t) and the power p(t) then sketch v(t), i(t), p(t), $p_r(t)$ and $p_x(t)$ for t=0 To 20msec.

2- The electrical power demand growth over the time is given by $P = P_0 e^{a(t-t_0)}$ Where **a** is the average per unit growth and equal 3.4 percent, P is the demand in year t and P_0 is the given demand at year t_0. Write a MATLAB script file which asks the user to enter P_0 in GW and its year, then plot the predicted peak demand in GW from the year of P_0 to the next fifteen years. Also estimate the peak demand in 2015.

3- The annual load of substation is given in the following table. During each month, the power is assumed constant at an average value. Write a MATLAB script file to plot the annual load curve. Write the necessary statements to find the average load and annual load factor.

Annual System Load	
Interval (Month)	*Load (MW)*
January	8
February	6
March	4
April	2
May	6
June	12
July	16
August	14
September	10
October	4
November	6
December	8

4- Modify the program in **prob.1** such that the following quantities can be entered by the user: The peak amplitude *Vm*, and the phase angle Θ of the sinusoidal supply $v(t) = Vm \cos(wt + \Theta)$. The impedance magnitude Z, and its phase angle $\emptyset$ of the load.

a) The program should produce plots for $i(t)$, $v(t)$, $p(t)$, $p_r(t)$ and $p_x(t)$, similar to prob.1.

b) Run the program for $Vm = 100$ V, $\Theta = 0$ and the following loads: An inductive load, $Z = 1.25\angle 60^o$, A capacitive load, $Z = 2\angle -30^o$, A resistive load, $Z = 2.5\angle 0^o$.

c) If the above loads are all connected in parallel across the same power supply, determine the total real and reactive power taken from the supply.

5- Three loads are connected in parallel across a 12.47 kV three-phase supply.
Load 1: Inductive load, 60 kW and 660 kvar.
Load 2: Capacitive load, 240 kW at 0.8 power factor.
Load 3: Resistive load of 60 kW.
Write a MATLAB script file to
   a) Find the total complex power, power factor, and the supply current.
   b) A Y-connected capacitor bank is connected in parallel with the loads. Find the total kvar and the capacitance per phase in μF to improve the overall power factor to 0.8 lagging. What is the new line current?

6- Three parallel three-phase loads are supplied from a 207.85-V rms, 60-Hz three-phase supply. The loads are as follows:
Load 1: A 15 HP motor operating at full-load, 93.25 percent efficiency, and 0.6 lagging power factor.
Load 2: A balanced resistive load that draws a total of 6 kW.
Load 3: A Y-connected capacitor bank with a total rating of 16 kvar.
Write a MATLAB script file to
   a) Find the total system kW, kvar, power factor, and the supply current per phase?
   b) Find the system power factor and the supply current per phase when the resistive load and induction motor are operating but the capacitor bank is switched off?