Menoufiya University		Department : Electrical Engineering
Faculty of Engineering		Year : 2nd Year
Shebin El-Kom		subject : Computer Applications (2)
First Semester, Final Exam		Code : ELE214
Academic Year :2013-2014	Minufiya University	Date : 15-1-2014
Mark :60		Time allowed : 3 Hours

Answer ALL the following Questions :

Your answers must be clear, explicit, specific and written in **m-Files:**

Q-1: Use **Matlab** to insert the following matrix and implement the following matrix operations:

$$A=\begin{pmatrix} 2 & 4 & 4 & 5 & 6 \\ 9 & 5 & 1 & 6 & 7 \\ 44 & 7 & 3 & 17 & 8 \end{pmatrix} \qquad B=\begin{pmatrix} 21 & 9 & 4 & 3 & 2 \\ 10 & 8 & 8 & 6 & 7 \\ 11 & 9 & 5 & 20 & 2 \end{pmatrix}$$

a- Obtain the summation of the two matrices
b- obtain the multiplication of the two matrices
c- obtain a matrix (C) define as the first three column of matrix (A)
d- obtain a matrix (D) define as [D]=B[:,(1,3,5)]=[]
e- obtain the inverse of matrix (C)
f- obtain the diagonal matrix of matrix (A)
g- obtain the determinant of matrix (D)

Q-2 1- $y1 = \cos x$ $0 \le x \le 360$ 2- $y2 = (1 + e^{-0.005t})(\sin t)$ $0 \le t \le 0.01$

3- $y3 = \sqrt[3]{m}$ $0 \le m \le 10$ 4- $y4 = \cos(x - \frac{\pi}{2})$ $0 \le x \le 36$

Use **Matlab** to Plot the above equations . The result page must be only having three figures and the three figures must be side by side in single window. Use labels and format to output results

Q-3: The given circuit represents a full-wave half-controlled bridge rectifier. The input is a sine wave of amplitude 310 V and frequency 60 Hz. The delay angle is α = 55°. The load resistance RL = 50 Ω.

1. Plot the input as well as the output voltage on one page
Below the other for a period of 50 µs.
2. Obtain and print the average load current and average dc voltage across the load resistance.
3. Obtain and print the rms value of the output voltage and the power dissipated in the load.
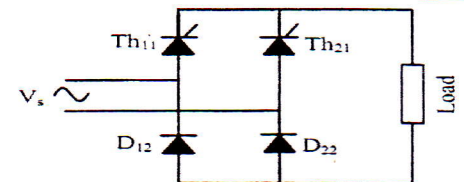
Q-4: For the following circuit, if the switch is opened at t = 0, find the voltage across capacitor by the circuit analysis , then use **MATLAB** to plot the voltage for the time interval $0 \le t \le 5s$
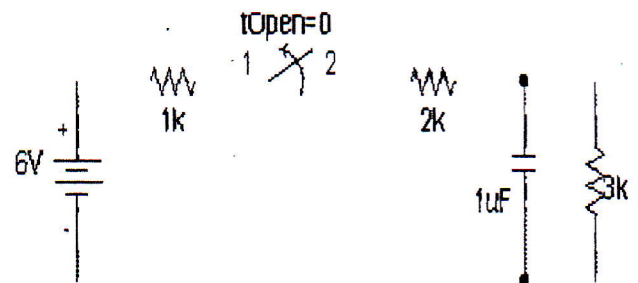
Q-5: Explain how to solve the following problems and write short **MATLAB** m-files to implement the solution of each problem:

A- Obtain the partial fraction expansion of the following function and also obtain the roots of the numerator:

$$\frac{X^8 + X^5 + X^4 + X^3 + X^2 + 4}{x^2 + 8}$$

B- Express the following function as a quotient of polynomials:

$$(1/(x+1)) + (1/(x+8)) + (3x^3 + 2x + 1)$$

C- Use MATLAB to calculate Z where A and X are constants

$$Z = \sum_{i=1}^{20} \frac{x^i}{A + i!}$$

d- Use MATLAB to find the solution of the following linear system:

$$3x_1 + 2x_3 + 6x_4 = -12 \; ; \; x_2 - 4x_3 + 9x_4 = 0 \; ; \; 4x_2 - 5x_3 - 7x_4 = 7 \; ; \; -6x_1 - 15x_2 - 8x_3 = 66$$

Q-6: The daily load demand of an electric power station is recorded every hour for 24 hours starting from mid-night and it was as follows:

hr	0	1	2	3	4	5	6	7	8	9	10	11
Power %	78.12	70.31	62.50	57.03	55.46	55.46	60.93	76.56	90.62	96.87	98.43	99.21

hr	12	13	14	15	16	17	18	19	20	21	22	23
Power %	100	100	98.43	93.75	85.93	75.78	71.09	78.12	89.84	94.53	92.18	85.93

Where the power is given as a percentage of maximum power.

Design a single MATLAB program to carry-out the following operations:

a- Plot the load curve of this power station.

b- Estimate and print the percentage load demand at the following times: 6.30 am, 10.15 am, 2.45 pm, 6.15 pm, and 9.30 pm. (Use MATLAB numerical interpolation functions).

c- Obtain a 13th order polynomial fitting the load demand as a function time. Your program should print the polynomial coefficients and plot the original data as well as that obtained from polynomial fitting on thesame graph to evaluate the accuracy of curve fitting.

With Best Wishes

	This exam measures the following ILOs					
Skills	Knowledge &Understanding Skills		Intellectual Skills		Professional Skills	
	A2, A5, A13		B1, B2, B7, B8		C1,C5,C6	
Question Number	Q1	Q2	Q3	Q4	Q4	Q5	Q6