بسم الله الرحمن الرحيم

Menoufiya University
Faculty of Engineering, Shebin El Kom
Subject: *ELE 214 Computer Applications*
Electrical and Computer Engineering program

Time : 3 Hour
Marks : 60
Date : 13/6/2016
Final Term Exam

Q1: Basics (20 Marks)

1. Rewrite the following sentences in a correct form,(a,b,c,x,φ,Θ are constants) (5 Marks)
   - X١=b*exp(-3x+a*sqrt(b*c^3)*acos(φ)
   - X٢=b*a^3.4*lag10(102x)
   - X٣=abs(b*x^3*cos(φ))
   - X٤=b*exp(-3*x +a*sqrt(b*c^3)*acosh(Θ)
   - X٥=a^x*c^3*y)*log(102x)
2. Draw the output of the following subprogram,(2 Marks)

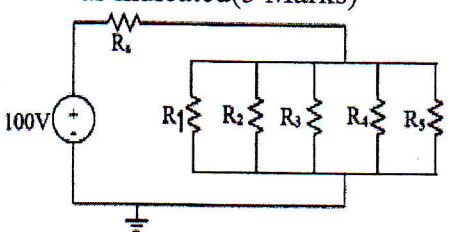
```
wt = 0:pi/100:2*pi;
x=wt*180/pi
y1= 100*sin( wt)
y2 =100* sin(wt-0.25);
y3 = 100*sin(wt-0.5);
plot(x,y1,x,y2,x,y3);grid;axis([0 360 -110 110]);
ylabel('Voltage, in volt');
xlabel(' Time in second ');
```

3. Re-write the above subprogram so that y1,y2 and y3 are drawn in one page under each other's(1 Marks)
4. Write a function and the statements that required to obtain $Q = \int_{x=0}^{x=2} f(x).dx$ (2 Marks)
   Where $f(x) = \frac{1}{x^3+x^2-2x+3}$
5. Read the following A matrix below and write the output of the following : (6 Marks)
   - A(:,3), A(4,:)=[], [A(:,1),A(:,4)] , [A(:,1);A(:,4)]
   - Convert the matrix A to one column.
   - Create a new matrix consists of rows 1,5,3,2 of matrix A
   - Create a new matrix consists of columns 1,3,2,5 of matrix A

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 \\ 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 \end{pmatrix}$$

6. Write the values of X1 and X2 where where X1= linspace(0,9,10) , X2= length(1: 0.1 : 10) (1 Marks)

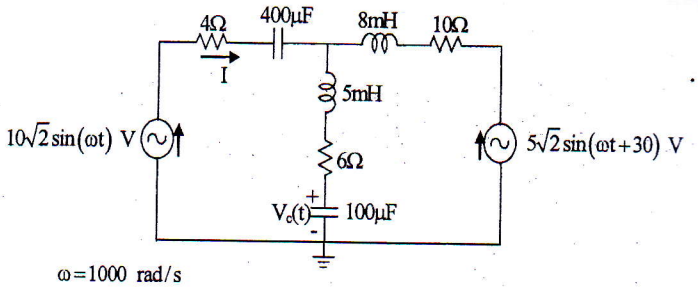
7- Re-write the following subprogram after correcting the errors and write the program output as indicated(3 Marks)



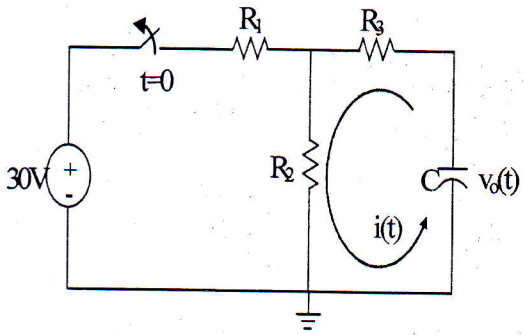

```
V = 100; Rs = 10;
R=[10;10;10;10;10;10];
Req = 1/sum(1/R);
Rtotal= Rs + Req;
Is = V/RTotal;
V4 = is*Req;
R4 = 200;
I4 = V4/r4;
fprintf('**********************************\n');
fprintf('The results are:\n');
fprintf('   Source Current   = %10.3f Amps\n',is);
fprintf('   Current in R4    = %10.3f Amps\n',i4);
fprintf('**********************************\n');
```

Q2: (10 Marks)

1. For the circuit shown in the following figure use MATLAB to **determine and plot** the current $i_1(t)$ and voltage $v_c(t)$, use label and titles (3 Marks)



2- For the following circuit, if the switch is opened at t = 0 and after one second the switch is re-closed. Find $v_o(t)$ and then use MATLAB to plot $v_o(t)$ for the time interval $0 \leq t \geq 5\,s$ (7 Marks)



E=30 V
R_1=20kΩ
R_2=40kΩ
R_3=10kΩ
C=1μF

Q3: (10 Marks)

1. The following table represent the relation between x and y (4 Marks)

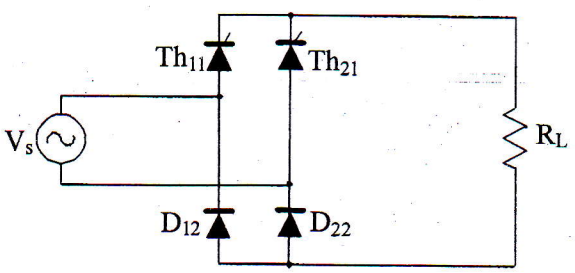
x	0.1	0.165	0.225	0.28	0.37	0.45	0.54	0.65	0.75	0.85
y	45	80	110	139	168	198	218	240	253	262

- Consider the following subprogram and write the output values/constant represented by Y1 and Y2

```
clear
clc
x=[0.1,0.165,0.225,0.28,0.37,0.45,0.54,0.65,0.75,0.85];
y=[45,80,110,139,168,198,218,240,253,262];
y1=polyfit(x, y, 6);
X2=[0.10,0.28,0.54,0,85];
y2=interp1(x, y, x1);
```

2. The circuit represents a full wave half-controlled bridge rectifier. Design a single MATHLAB program to:
   - Plot the input as well as the output voltage on two windows one below the other for 30 ms
   - Obtain the rms value of the output voltage and the power dissipated in the load.

   Use labels and format for your output results, considering the input voltage V=18 sin wt, RL= 100 Ohm, f=50Hz, The delay angle α =45^0 (6 Marks)



Q4: (10Marks)

1. Obtain the partial fraction expansion of the following function and also obtain the roots of both the numerator and denominator: (3 Marks)

$$f(x)=\frac{X^8+X^5+X^4+X^3+X^2+4}{x^2+8}$$

2. Express the following function as a quotient of polynomials: (2 Marks)

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

3. Use MATLAB to solve the following differential equation: (5 Marks)

$$\frac{d^3y(t)}{dt^3}+7\frac{d^2y(t)}{dt^2}+14\frac{dy(t)}{dt}+12y(t)=10$$

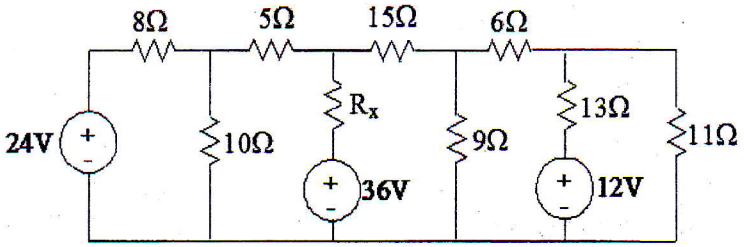
with initial conditions:

$$y(0)=1,\ \frac{dy(0)}{dt}=2,\ \frac{d^2y(0)}{dt^2}=5$$

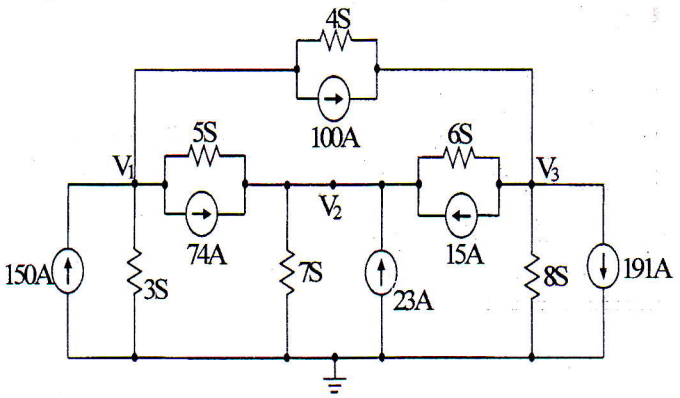
plot y(t) within the interval $0 \le t \le 5$ sec

Q5: (10Marks)

1. Use MATLAB to analyze the below circuit and plot the power dissipated in R_x as a function of this resistance for variable values in the range $2.5 \le R_x \le 30$. Determine the maximum power dissipated by R_x and its value at maximum power dissipation. (6 Marks)



2. Use nodal analysis to solve for the nodal voltages for the circuit shown. Solve the equations using MATLAB. (4 Marks)



With Best Wishes

	This exam measures the following ILOs		
Skills	Knowledge &Understanding Skills	Intellectual Skills	Professional Skills
	A7,A17,A21	B1,B17,B18,B19,B21	C2,C19,C21
Question Number	Q1	Q2,Q3,Q4,Q5	Q2, Q3,Q4,Q5