التصميم باستخدام الحاسب

EE231

للفصل الرابع

هذا العمل من اعداد:

اتحاد طلبة كلية التقنية الالكترونية – طرابلس

CAD (EE231)
Final Exam (Spring 2015)
(20 points)

instructor: MEng. Hosam Almqadim   Time Allowed: 45 minutes

Q1. Evaluating the following Matlab Codes? (10 points, 2 each)

1.
```
for i=10:-2:0
    for j= 0:2:i
        fprintf('%d', j)
    end
    fprintf('\n')
end
```

(handwritten answer:)
2 4 6 8 10
2 4 6 8
0 2 4

0 2 4 6 8 10
0 2 4 6 8
0 2 4 6
0 2 4
0 2
0

2.
```
a=0;b=1;n=6;
x= linspace(a,b,n)
```

(handwritten answer:) 0 -0.2 -0.4 -0.8 -0.8 -1

3.
```
a=[2 4; 6 8];
a(:,2)
a(1,:)
```

4.
```
y =((24 <= 72) && 0) || ((56 - (22 * 3)) == 0) && (25 == 25)
```
(handwritten: 1)

5.
```
x=0:0.1:1; x1=x(2:4:11), x2=x([1,3,4,11])
```

Q2. How to write the following Mathematical expressions in Matlab? (5 points, 1 each)

1. $|x|$ *(handwritten:)* 80 Syn x

2. $\dfrac{d^2}{dx^2}\tan^{-1}(\pi x)$

3. $\int_0^\pi \sin(x) + \cos^2(2\pi x)\, dx$

4. $5\sqrt{2}\, e^{\frac{\pi}{2}i}$

5. e

Q3. Show and explain the cause of errors in the following codes? (5 points, 1 each)

1. `x=1:10; y=10:20; plot(x,y)`
2. `asin^2(x)`
3. `1A=0:10:100; B-1=100:-10:0;`
4. `eye(5)`

5.
```
A=15; B=10
while A>=5
        B=B+A+1;
end
```

(handwritten:)
eye(3,3)

asin(x)^2

Q1. (9 points) Solve the following **Algebraic Equations** using MATLAB, your answer must be in **decimal** form?

1. $|2x-1|=5$

2. $x^3 - 4 = \dfrac{d^3}{dx^3}\left(-\dfrac{x^5}{20} - 2\right)$

Syms x; Solve (x^3 _ 4 _ diff(-x^2/20 -2, 3)))

3. $exp(x^2 - 6x - 16) = \dfrac{d}{dx}(5x)$

Syms x

Solve (exp(x^2 - 6*X-16) _ diff(5*X)))

Q2. (5 points) Solve the following **System of linear Algebraic Equations** using **Three Methods?**

-x+3y-1=-z

2x+5y-2=1

3x+y+2=2z

diff

① $\sqrt[5]{a}$

$e^{180°i}$

② $5!$

③ $\sin^{-1}(x)$ a $\sin(x)$

④ e^x

⑤ $\ln(x)$

⑥ $\log(x)$

⑦ $\left[\sqrt[5]{\sqrt{2}} \, e^{\frac{\pi}{2}i} \right]$

⑧ $\sqrt{a} \, e^{45i}$

⑨ complex conjugated x where x is a complex numbe

⑩ $a = [1\ 2\ 3]; \quad b = [4\ 5\ 6], \quad a.b \text{ and } a \times b$

⑪ $x = [A_1\ A_2\ A_3] \Rightarrow \begin{bmatrix} A_1 \\ A_2 \\ A_3 \end{bmatrix} \qquad x' = [A_1\ A_2\ A_3]$

⑫ if $a = \frac{1}{2}$ how to get a in the form a.s   sym(1

double

⑬ ✓ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix} \rightarrow a_1 + a_2 + a_3 + a_2$ ⟹ syms a1 a2 a3 a1

$s =$

$s(1) + s(3) + s(2) + s($

⑭ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix}$

⑮ solve: $x^2 - 3x + 9 = 0$ ✓

⑯ solve: $x - 2y = 6, \quad 3x + y = 9$

⑰ $\frac{d}{dx} \sin(x)$ diff(sin(x))

cross

Syms a x b

int(sin(x) + cos(2x), 0,

⑱ $\int_0^\pi \sin(x) + \cos^2(2x)\, dx$

⑲ $\int x^3 + 5x^2\, dx$

⑳ $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$

exp(Deg2rad(18)*i)

$5 * \text{sqrt}(2) * \exp(\pi/2*i)$

$\cos^2(2*x)$ &

int(sin(x) + cos(2*X)^2, 0, Pi)

sqrt(u) *

nth root

② Factorial (S)

③ asin(x)

④ exp(x)

⑤ log(x)

? log₁₀(x)

⑦ ~~sqrt~~
S* sqrt(2)* exp(Pi/2 i)

⑧ sqrt(a) . exp(rad2deg(45 i))

⑨ x = 1 + 1j ⟹
conj(1+1j) = 1 − 1j

For i = 1 : 5
  for j = 1 : 5
    disp(i * j)
  end
  fprintf('\n')
end

2 * 4

S = [1 2 3 4 ; 1 2 3 4]

max(size(s)) + min(size(s))
  4 + 2 = 6

2   4 + 4 = 8

الاسم : .... ، رقم القيد: ....

CAD (EE231)

Final Practical Exam (Spring 2015)

(40 points)

Instructor: MEng. Hosam Almqadim

Time Allowed: 70 minutes

Q1. (16 points) Solve the following **Algebraic Equations**, your answer must be in **decimal** form?

1. $x(e^x - x - 1) = 9$
2. $x^3 - 4 = \frac{d^2}{dx^2}(-x^3 - 2)$
3. $|2x - 1| = 5$
4. if $g(x) = 2x$ then solve: $\int \sqrt{g(x^2)}\, dx = 3$

(handwritten notes in margins):

Syms X

Solve $(X(e^x - x - 1) = 9)$

$[X1, X2, X3] = Solve$

Solve $($ ⊞

Solve $(int(g(x))$

$g(x) =$

Q2. (9 points) Solve the **System of Equations** using **three ways**, your answer must be in **decimal** form?

$$x - 2y - 10 = -z$$
$$x + 3y - 9 = -3$$
$$2x - 4z = -10$$

(handwritten notes in margins):

Solve $(abs(2x - 1) = 5)$

Syms,

Solve $(int(sqrt(g(x))) = 3)$

$g(x) = 2(x)$

Sy $g = 2x$

Q3. (15 points) Modify the given Matlab Code to fulfill the following:

1. Entering the value of fm, fc, Am, and Ac by the user when we run the code?
2. Plot **Message signal** and **Carrier signal** in one figure frame divided to two?
3. Plot **Am signal in Time** and **Frequency domain** in another figure divided to two?

```
clear;
close all;
clc
% Message signal
Am=5;
fm=10;
t=0:0.001:1;
mt_am=Am*sin(2*pi*fm*t);
% Plotting the message signal
subplot(4,1,1)
plot(t,mt_am)
% Carrier Signal
Ac=5;
fc=100;
ct_am=Ac*cos(2*pi*fc*t);
% plottiong the Carrier signal
subplot(4,1,2)
plot(t,ct_am)
```

```
% AM signal
st_am= mt_am.*ct_am;
%plotting AM signal in time domain
subplot(4,1,3)
plot(t,st_am)
% frequency domain
cf_am=fft(ct_am);
cf_am=abs(cf_am);
freq=0:length(cf_am)-1;
% plotting Am signal in Frequency domain
subplot(4,1,4)
plot(freq,cf_am)
```

(handwritten): $X*e^X - X*X - X = 9$

2

CAD (EE231)
Final Practical Exam (Spring 2015)
(40 points)

Instructor: MEng. Hosam Almqadim   Time Allowed: 70 minutes

Q1. (16 points) Solve the following **Algebraic Equations**, your answer must be in **decimal form?**

1. $x(e^x - x - 1) = 9$
2. $x^3 - 4 = \frac{d^2}{dx^2}(-x^3 - 2)$
3. $|2x - 1| = 5$
4. if $g(x) = 2x$ then solve: $\int \sqrt{g(x^2)}\ dx = 3$

Q2. (9 points) Solve the **System of Equations** using **three ways,** your answer must be in **decimal form?**

```
x - 2y - 10 = -z
x + 3y - 9 = -3
2x - 4z = -10
```

Q3. (15 points) Modify the given Matlab Code to fulfill the following:

1. Entering the value of fm, fc, Am, and Ac by the user when we run the code?
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fm=10;
t=0:0.001:1;
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% Plotting the message signal
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ct_am=Ac*cos(2*pi*fc*t);
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plot(t,ct_am)
```

```
% AM signal
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%plotting AM signal in time domain
subplot(4,1,3)
plot(t,st_am)
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cf_am=fft(ct_am);
cf_am=abs(cf_am);
freq=0:length(cf_am)-1;
% plotting Am signal in Frequency domain
subplot(4,1,4)
plot(freq,cf_am)
```

How to write the following in matlab

① $\sqrt[5]{a}$

② $5!$

③ $\sin^{-1}(x)$

④ e^x

⑤ $\ln(x)$

⑥ $\log(x)$

⑦ $\sqrt[5]{2}\, e^{\frac{\pi}{2}i}$

⑧ $\sqrt{a}\, e^{45i}$

⑨ complex conjugated x where x is a complex Number

⑩ $a=[1\ 2\ 3]$; $b=[4\ 5\ 6]$; $a.b$ and $a\times b$

⑪ $X=[A_1\ A_2\ A_3] \Rightarrow \begin{bmatrix} A_1 \\ A_2 \\ A_3 \end{bmatrix}$ $X' = \begin{bmatrix} A_1 & A_2 & A_3 \\ & A_2 & \\ & A_2 & \end{bmatrix}$

⑫ if $a=\frac{1}{2}$ how to get a in the form as sym(1 double

$S=$

⑬ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix} \rightarrow a_1 + a_2 + a_3 + a_2$ ⇒ syms a1 a2 a3 a4 $S(1) + S(3) + S(2) + S(4)$

⑭ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix}$

⑮ solve: $x^2 - 3x + 9 = 0$

⑯ solve: $x - 2y = 6,\ 3x + y = 9$

⑰ $\frac{d}{dx}\sin(x)$ diff(sin(x))

⑱ $\int_0^\pi \sin(x) + \cos^2(2x)\,dx$

⑲ $\int x^3 + 5x^2\,dx$

⑳ $\lim_{n \to \infty}\left(1 + \frac{1}{n}\right)^n$

cos^2(2*x) α
int(sin(x) + cos(2*x)^2, 0, Pi)

CAD (EE231)
Final Practical Exam (Spring 2015)
(40 points)

Instructor: MEng. Hosam Almqadim   Time Allowed: 70 minutes

Q1. (16 points) Solve the following **Algebraic Equations**, your answer must be in **decimal** form?

1. $x(e^x - x - 1) = 9$
2. $x^3 - 4 = \frac{d^2}{dx^2}(-x^3 - 2)$
3. $|2x - 1| = 5$
4. if $g(x) = 2x$ then solve: $\int \sqrt{g(x^2)}\ dx = 3$

Q2. (9 points) Solve the **System of Equations** using **three ways,** your answer must be in **decimal** form?

```
x  -  2y  -  10  =  -z
x  +  3y  -  9   =  -3
2x  -  4z  =  -10
```

$2x - 1 = 5$
$\frac{2x+1}{2} = \frac{5}{2}$
$2 \times 1 = 5$
$x = 2$

$2x - 1 = 5$
$2x + 1 = 5$
$2x = 6$
$x = 3$
$2x = 5 - 1$
$2x = 4$
$x = 4$

Q3. (15 points) Modify the given Matlab Code to fulfill the following:

1. Entering the value of **fm, fc, Am,** and **Ac** by the user when we run the code?
2. Plot **Message signal** and **Carrier signal** in one figure frame divided to two?
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clear;
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plot(t,mt_am)
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Ac=5;
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ct_am=Ac*cos(2*pi*fc*t);
% plottiong the Carrier signal
subplot(4,1,2)
plot(t,ct_am)
```

```
% AM signal
st_am= mt_am.*ct_am;
%plotting AM signal in time domain
subplot(4,1,3)
plot(t,st_am)
% frequency domain
cf_am=fft(ct_am);
cf_am=abs(cf_am);
freq=0:length(cf_am)-1;
% plotting Am signal in Frequency domain
subplot(4,1,4)
plot(freq,cf_am)
```

CAD (EE231)
Final Exam (Spring 2015)
(20 points)

instructor: MEng. Hosam Almqadim   **Time Allowed: 45 minutes**

Q1. Evaluating the following Matlab Codes? (10 points, 2 each)

Time Allowed : 45min

1.
```matlab
for i=10:-2:0
    for j= 0:2:i
        fprintf('%d', j)
    end
    fprintf('\n')
end
```

2.
```matlab
a=0;b=1;n=6;
x= linspace(a,b,n)
```

3.
```matlab
a=[2 4; 6 8];
a(:,2)
a(1,:)
```

4.
```matlab
y =((24 <= 72) && 0)||((56 - (22 * 3)) == 0)) && (25 == 25)
```

5.
```matlab
x=0:0.1:1; x1=x(2:4:11), x2=x([1,3,4,11])
```

Q2. How to write the following Mathematical expressions in Matlab? (5 points, 1 each)

1. $|x|$

2. $\frac{d^2}{dx^2}\tan^{-1}(\pi x)$

3. $\int_0^\pi \sin(x) + \cos^2(2\pi x)\,dx$

4. $5\sqrt{2}\,e^{\frac{\pi}{2}i}$

5. e

Q3. Show and explain the cause of errors in the following codes? (5 points, 1 each)

1. `x=1:10; y=10:20; plot(x,y)`
2. `asin^2(x)`
3. `1A=0:10:100; B-1=100:-10:0;`
4. `eye 5`

5.
```matlab
A=15;  B=10
while A>=5

        B=B+A+1;
end
```

How to write the following in matlab

① $\sqrt[5]{a}$ ✓

② $5!$

③ $\sin^{-1}(x)$

④ e^x

⑤ $\ln(x)$

⑥ $\log(x)$

⑦ $\sqrt[3]{2}\, e^{\frac{\pi}{2}i}$

⑧ $\sqrt{a}\, e^{45i}$

⑨ complex conjugated x where x is a complex Number

⑩ $a=[1\ 2\ 3]; \quad b=[4\ 5\ 6]; \quad a.b \text{ and } a\times b$

dot(a,b) $a*b$

⑪ $X=[A_1\ A_2\ A_3] \Rightarrow \begin{bmatrix} A_1 \\ A_2 \\ A_3 \end{bmatrix} \qquad X' = [A_1\ A_2\ A_3]$

⑫ if $a=\frac{1}{2}$ how to get a in the form a.s

sym(1
double

⑬ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix} \rightarrow a_1 + a_2 + a_3 + a_2 \implies$ syms a1 a2 a3 a4

S(1) + S(3) + S(2) + S(4)

S=

⑭ $\begin{vmatrix} a_1 & a_2 \\ a_3 & a_4 \end{vmatrix}$

⑮ solve: $x^2 - 3x + 9 = 0$ ✓

⑯ solve: $x - 2y = 6, \quad 3x + y = 9$
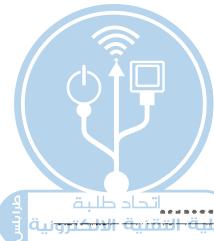
⑰ $\frac{d}{dx}\sin(x) \qquad \text{diff}(\sin(x))$

⑱ $\int_0^\pi \sin(x) + \cos^2(2x)\, dx$

⑲ $\int x^3 + 5x^2\, dx$

⑳ $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$

$\cos{^\wedge}2(2*x)\, \alpha$

$\text{int}(\sin(x) + \cos(2*x)^\wedge 2, 0, Pi)$

(لا يسمح باستخدام الآلة الحاسبة)

Q1. (3 Marks, 0.5 each) Evaluate the following MATLAB codes: **Answer:**

- linspace(15,1,2)

- (24 <= 72) || 3 & (56 - (22 * 3) == 0) & (25-1 == 24)

- a=[1 2 3 4] ; a(3,1:4)=2

- b=[2 4 6; 8 10 12; 14 16 18]; b(3:-1:1,3:-1:1)

- t=rand; floor(t)

- sum(prod([2 4;2 3]))

Q2. (3 Marks, 0.5 each) Which of the following give the **same result**, choose **one answer**:

- linspace(15,1,3)
  - A. 1:8:16
  - B. 16:-8:1
  - C. 1:7:15
  - D. None of the above
- 4^3^2
  - A. 4^(3^2)
  - B. 2*2^3^2
  - C. (4^3)^2
  - D. None of the above

- iskeyword for
  - A. 5
  - B. iskeyword sin
  - C. 4
  - D. None of the above
- sin(pi/2)
  - A. sin(90)
  - B. sind(2*pi/4)
  - C. sind(360/4)
  - D. None of the above

- x=[2 4 ; 6 8]; x(3)
  - A. x=[2 4 ;6 8]; x(2,1)
  - B. x=[2 4 ;6 8]; x(end-1,2)
  - C. x=[2 4 ;6 8]; x(4:-1:1)
  - D. None of the above
- t=0:10; mean(t)
  - A. t=0:10; sum(t)/t
  - B. t=0:10; sum(t)/size(t)
  - C. t=0:10; sum(t)/10
  - D. None of the above

Q3. (4 Marks, 1 each) Which of the following statements is not valid in MATLAB?

```
1. y=[2 4]; x=[2;2]; y.*x                                    (   )

2. A=[4 , 2 , 3 , 5]; B=[1 , 1 , -4 , 2]; C=cross(A,B)       (   )

3. f=@(x,y)y.*x^2; f([2 ; 4])                               (   )

4. double(solve('x^2-3*x+9=0'))                             (   )
```

Q1. (9 points) Solve the following **Algebraic Equations** using MATLAB, your answer must be in **decimal** form?

1. $|2x-1|=5$

```
>> syms x;  double(solve(abs(2*x-1)-5))
ans =
3
-2
```

2. $x^3 - 4 = \dfrac{d^3}{dx^3}\left(-\dfrac{x^5}{20} - 2\right)$

```
>> syms x;  double(solve(x^3-4-diff(-x^5/20-2,3)))
ans =
 -2
 -2
  1
```

3. $exp(x^2 - 6x - 16) = \dfrac{d}{dx}(5x)$

```
>> syms x
>> double(solve(exp(x^2-6*x-16)-diff(5*x)))
ans =
  2.1584
  8.1584
```

Q2. (5 points) Solve the following **System of linear Algebraic Equations** using Three Methods?

-x+3y-1=-z

2x+5y-2=1

3x+y+2=2z

-x + 3y + z = 1

2x + 5y + 0z = 3

3x + y - 2z = -2

```
>> a=[-1 3 1; 2 5 0; 3 1 -2]; b=[1;3;-2];
>> inv(a)*b
ans =
  2.3333
 -0.3333
  4.3333
>> a^-1*b
ans =
  2.3333
 -0.3333
  4.3333
>> a\b
ans =
  2.3333
 -0.3333
  4.3333
```

```
>> linsolve(a,b)
ans =
  2.3333
  0.3333
  4.3333
>> rref([a,b])
ans =
  1.0000      0      0   2.3333
       0  1.0000      0   0.3333
       0      0  1.0000   4.3333
>> syms x y z
>> [x y z]=solve(    )
>> double([x;y;z])
```

تمنياتي للجميع بالتوفيق
أستاذ المادة: حسام الدين الهنشيري

Q3. (10 points) Define a function in MATLAB for the following:

- Convert from **degrees** to **radians, input** of the function **should accept** a scalar/matrix, and **output** of the function **must always be fractional.**

- $$x = \left(\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}} \right)^{\frac{1}{3}} + \left(\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}} \right)^{\frac{1}{3}}$$

Q4. (6 points) Find the following using MATLAB:

- $\int e^{2x^2+1} . 4x \, dx$

int(exp(2*x^2+1)*(4*x)

ex p(1)* exp(2*x^2)

- $\int_0^{2\pi} t^3 . sin^2(1+t^4) \, dt$

int(t^3 * sin(1+t^4)^2, 0, 2π)

194.8445

- $\frac{d}{dx} \sqrt{\frac{1+x}{1-x}}$

diff(sqrt((1+x)/(1-x)))

كلية التقنية الالكترونية
College of Electronic Technology - Tripoli

قسم: التحكم.   أسئلة الامتحان النصفي لمادة: التصميم باستخدام الحاسب.
لطلبة الفصل: الرابع.   رمز المادة: EE231   التاريخ: 26-04-2016.

الفصل الدراسي: ربيع 2016.   اسم الأستاذ/المنسق: حسام الدين الهنشيري.   الزمن: نصف ساعة.

اسم الطالب: ....   رقم القيد: ...8.4.2.1.0....   المجموعة: ....

------------------ (لا يسمح باستخدام الآلة الحاسبة) ------------------

Q1. (3 Marks, 0.5 each) Evaluate the following MATLAB codes: **Answer:**

- linspace(15,1,2)   15   1

- (24 <= 72) || 3 & (56 - (22 * 3) == 0) & (25-1 == 24) = 0

- a=[1 2 3 4] ; a(3,1:4)=2 $a = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 0 & 0 & 0 \\ 2 & 2 & 2 & 2 \end{bmatrix}$

- b=[2 4 6; 8 10 12; 14 16 18]; b(3:-1:1,3:-1:1) $b = \begin{bmatrix} 2 & 4 & 6 \\ 8 & 10 & 18 \\ 14 & 16 & 18 \end{bmatrix}$ $b = (3:-1:1, 3:-1)$
    $b = 2$

- t=rand; floor(t)   0

- sum(prod([2 4;2 3]))
$\begin{matrix} 2 & 4 \\ 2 & 3 \end{matrix} \Rightarrow 4 \quad 12 \Rightarrow 4+12 = 16$

Q2. (3 Marks, 0.5 each) Which of the following give the **same result**, choose **one answer**:

$x(1,2)$ $x = \begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$

- linspace(15,1,3)
  - A. 1:8:16
  - B. 16:-8:1
  - C. 1:7:15
  - D. None of the above

- iskeyword for
  - A. 5
  - B. iskeyword sin
  - C. 4
  - D. None of the above

- x=[2 4 ; 6 8]; x(3)
  - A. x=[2 4 ;6 8]; x(2,1)
  - B. x=[2 4 ;6 8]; x(end-1,2)
  - C. x=[2 4 ;6 8]; x(4:-1:1)
  - D. None of the above

- 4^3^2
  - A. 4^(3^2)
  - B. 2*2^3^2
  - C. (4^3)^2
  - D. None of the above

- sin(pi/2)
  - A. sin(90)
  - B. sind(2*pi/4)
  - C. sind(360/4)
  - D. None of the above

- t=0:10; mean(t)
  - A. t=0:10; sum(t)/t
  - B. t=0:10; sum(t)/size(t)
  - C. t=0:10; sum(t)/10
  - D. None of the above

0 1 2 3 4 5 6 7 8 9
n ≤ 10

Q3. (4 Marks, 1 each) Which of the following statements is not valid in MATLAB?

1. `y=[2 4]; x=[2;2]; y.^x`   ✗   (✗)
2. `A=[4 , 2 , 3 , 5]; B=[1 , -1 , -4 , 2]; C=cross(A,B)`   ✓   (✓)
3. `f=@(x,y)y.*x^2; f([2 ; 4])`   (✗)
4. `double(solve('x^2-3*x+9=0'))`   (✓)

تمنياتي للجميع بالتوفيق
أستاذ المادة : م. حسام الدين الهنشيري

Q1. (3 Marks, 0.5 each) Evaluate the following MATLAB codes:

Answer:

- **linspace(15,1,2)**

- **(24 <= 72) || 3 & (56 - (22 * 3) == 0) & (25-1 == 24)**

- **a=[1 2 3 4] ; a(3,1:4)=2**

- **b=[2 4 6; 8 10 12; 14 16 18]; b(3:-1:1,3:-1:1)**

- **t=rand; floor(t)**

- **sum(prod([2 4;2 3]))**

```
ans =   15    1

ans =   1

      1  2  3  4
      0  0  0  0
      2  2  2  2

ans =
     18  16  14
     12  10   8
      6   4   2

ans = 76
```

Q2. (3 Marks, 0.5 each) Which of the following give the **same result**, choose **one answer**:

- linspace(15,1,3)
  - A. 1:8:16
  - B. 16:-8:1
  - C. 1:7:15
  - ✓ D. None of the above
- 4^3^2
  - A. 4^(3^2)
  - B. 2*2*3^2
  - C. (4^3)^2
  - D. None of the above

- iskeyword for
  - A. 5
  - B. iskeyword sin
  - C. 4
  - D. None of the above
- sin(pi/2)
  - A. sin(90)
  - B. sind(2*pi/4)
  - C. sind(360/4)
  - D. None of the above

- x=[2 4 ; 6 8]; x(3)
  - A. x=[2 4 ;6 8]; x(2,1)
  - ✓ B. x=[2 4 ;6 8]; x(end-1,2)
  - C. x=[2 4 ;6 8]; x(4:-1:1)
  - D. None of the above
- t=0:10; mean(t)
  - A. t=0:10; sum(t)/t
  - B. t=0:10; sum(t)/size(t)
  - ✓ C. t=0:10; sum(t)/10
  - D. None of the above

Q3. (4 Marks, 1 each) Which of the following statements is not valid in MATLAB?

```
1. y=[2 4]; x=[2;2]; y.^x                              ( × )

2. A=[4 , 2 , 3 , 5]; B=[1 , -1 , -4 , 2]; C=cross(A,B)   ( × )

3. f=@(x,y)y.*x^2; f([2 ; 4])                           ( × )

4. double(solve('x^2-3*x+9=0'))                        ( √ )
```

تمنياتي للجميع بالتوفيق

أستاذ المادة : م. حسام الدين الهنشيري

Q3. (**10 points**) Define a function in MATLAB for the following:

- Convert from **degrees** to **radians, input** of the function **should accept a scalar/matrix,** and **output** of the function **must always be fractional.**

```
>> d2r=@(d)sym(d*pi/180)
d2r =
    @(d)sym(d*pi/180)
```

or

```
function [ r ] = d_2_r_1( d )
r=sym(d*pi/180)
end
```

- $$x = \left(\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}\right)^{\frac{1}{3}} + \left(\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}\right)^{\frac{1}{3}}$$

```
>> x=@(q,p)(q/2+sqrt(q^2/4+p^3/27))^(1/3)+(q/2-sqrt(q^2/4+p^3/27))^(1/3)
------------------or----------------
>> x=@(q,p)(q/2+(q^2/4+p^3/27)^(1/2))^(1/3)+(q/2-(q^2/4+p^3/27)^(1/2))^(1/3)
------------------or----------------
function [ x ] = q3( q , p )
x=(q/2+(q^2/4+p^3/27)^(1/2))^(1/3)+(q/2-(q^2/4+p^3/27)^(1/2))^(1/3)
end
------------------or----------------
function [ x ] = q3( q , p )
x=(q/2+sqrt(q^2/4+p^3/27))^(1/3)+(q/2-sqrt(q^2/4+p^3/27))^(1/3)
end
```

Q4. (**6 points**) Find the following using MATLAB:

- $\int e^{2x^2+1}.4x\,dx$

```
>> syms x;  int(exp(2*x^2+1)*4*x)
ans =
exp(1)*exp(2*x^2)
```

- $\int_0^{2\pi} t^3.\sin^2(1 + t^4)\,dt$

```
>> syms t; double(int(t^3*sin(1+t^4)^2,0,2*pi))
ans =
  194.8445
```

- $\frac{d}{dx}\sqrt{\frac{1+x}{1-x}}$

```
>> syms x; diff(((1+x)/(1-x))^0.5)
ans =
-(1/(x - 1) - (x + 1)/(x - 1)^2)/(2*(-(x + 1)/(x - 1))^(1/2))
>> syms x; diff(sqrt((1+x)/(1-x)),x)
ans =
-(1/(x - 1) - (x + 1)/(x - 1)^2)/(2*(-(x + 1)/(x - 1))^(1/2))
```

تمنياتي للجميع بالتوفيق
أستاذ المادة: حسام الدين الهنشيري

كلية التقنية الالكترونية
College of Electronic Technology - Tripoli

قســـم: التحكم. أسئلة الامتحان النصفي العملي لمادة: التصميم باستخدام الحاسب
لطلبة الفصل: الرابع كلية. رمز المادة: EE241. التاريخ:2016/04/26.

الفصل الدراسي: ربيع 2016. اسم الأستاذ/المنسق: حسام الدين الهنشيري. الزمن: ساعة و نصف.

اسم الطالب: .... رقم القيد: ١٤٢١٥٨ .... المجموعة: ....

Q1. (9 points) Solve the following **Algebraic Equations** using MATLAB, your answer must be in **decimal** form?

1. $|2x-1|=5$

Solve('abs(2*x-1)=5')

③

ans
3
-2

Syms x
C= diff((-x^5/20)-2, 3)

C = -3*x^2

2. $x^3 - 4 = \frac{d^3}{dx^3}\left(-\frac{x^5}{20} - 2\right)$

Solve('(x^3)-4=C')

$(4+C)^{(1/3)}$
$-1/2*(4+C)^{(1/3)}+1/2*i*3^{(4+C)^{(1/3)}}$
$-1/2*(4+C)^{(1/3)}-1/2*i*3^{(1/2)}*(4+C)^{(1/3)}$

وإذا أردنا أن تكون
صورة عشرية
double(ans)

②

3. $exp(x^2 - 6x - 16) = \frac{d}{dx}(5x)$ ⇒ Syms x = diff(5*X)

a=5

Solve('exp(x^2-6*x-16)=a')
solve('exp(x^2-6*x-16)-a')   الحل
$3+(25+log(a))^{(1/2)}$
$3-(25+log(a))^{(1/2)}$

or

decimal ?

Q2. (5 points) Solve the following **System of linear Algebraic Equations** using **Three Methods?**

$h = [-1\ 3\ 1; 2\ 5\ 0; 3\ 1\ -2]$

-x+3y-1=-z ⟩ $-x + 3y + Z = 1$
2x+5y-2=1 ⟩ ⇒ $2x +5y + 0 = 3$ ⇒ $h = \begin{bmatrix} -1 & 3 & 1 \\ 2 & 5 & 0 \\ 3 & 1 & -2 \end{bmatrix}$
3x+y+2=2z ⟩ $3x + y - 2Z = -2$

$x = h^{-1} * a$ or   h\a $a = \begin{bmatrix} 1 \\ 3 \\ -2 \end{bmatrix}$ ⇒ a[1;3;-2]
inv(h)*a   or mldivide(h,a)
rref([h a])

③

Solve
[x y z]= Solve('-x+3*y+Z=1';'2*x+5*y+0=3';
'3*x+y-2*Z=-2')   الحل

2,3333
-0.3333
4.3333

كلية التقنية الالكترونية
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قســـم: التحكم. أسئلة الامتحان النصفي العملي لمادة: التصميم باستخدام الحاسب.
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اسم الطالب: .... رقم القيد: 142108 .... المجموعة: ....

Q3. (10 points) Define a function in MATLAB for the following: تعريف الدالة

- Convert from **degrees** to **radians**, **input** of the function **should accept a scalar/matrix**, and **output** of the function **must always be fractional**.

```
% This program convert from degrees to radians
function [rad_v] = ly_v(dey_v)
rad_v = dey_v * pi/180
end
```
>> edit

بحيث تستدعى الدالة في command window
ly_v(180)
ans = 3.1416

$$x = \left(\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}\right)^{\frac{1}{3}} + \left(\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}\right)^{\frac{1}{3}}$$

```
Function [x] = ly_u(q,p)
x = ((q/2 + sqrt((q^2)/4) + ((p^3)/27))^(1/3) +
((q/2) - sqrt((q^2)/4) + ((p^3)/27))^(1/3)
x = 1.9726 + 0.7500i
```
>> edit

تعريف الخط يتم استدعاء الدالة في صفحة command window
ly_u(3,4)

Q4. (6 points) Find the following using MATLAB:

- $\int e^{2x^2+1}.4x\,dx$

```
Syms x
int(exp(2*(x^2)+1)*(4*x))
```
ans => exp(2*x^2+1) => e^{2x^2+1}

- $\int_0^{2\pi} t^3.\sin^2(1+t^4)\,dt$

```
Syms t
int((t^3)*sin(1+t^4)^2, 0, 2*pi)
```
-1006329760 * sin(t)
ans => 194.8445

- $\frac{d}{dx}\sqrt{\frac{1+x}{1-x}}$

```
Syms x
v = diff(sqrt(1+x/1-x))
v = 0
```

تمنياتي للجميع بالتوفيق
أستاذ المادة: حسام الدين الهنشيري