الاجابه النموذجيه لامتحان نصف الفصل لماده تطبيقات الحاسب في الهندسه المدنيه الفصل الدراسي الصيفي لعام
2018 – 2017

Question I (5 Marks)

1. Which of the following statements shows the result of executing, in the Command Window
   >> (sin(-pi/2))^0.5 ; sin = size(1:5)
   a. 3   b. 1   **c. 1 5** √   d. i   e. none of above

2. After executing the following script file in MATLAB >> i = 4; x = 3i; y = x/2; z = x + y
   the displayed result is
   a. 18   **b. error message** √   c. 3 + 1.5 i   d. -1.5 + 3 i   e. none of above

3. Executing in the Command Window the following code >> y = a + b , a = 2 ; b = 3 ; returns
   a. 5   b. 2 - 2 i   **c. error message** √   d. NaN   e. none of the above

4. The Matlab command shown below will assign what value to the variable abc? >> abc = sin(pi)
   a. 0 √   b. some number that is not 0, 1, or -1   c. 1   d. -1   e. error message

5. Which Matlab command is best used to **execute statements if condition is true**?
   a. if √   b. for   c. while   d. when   e. where

6. After the code below executes, what does the variable x1 contain? >> aa = 45:90;
   x1 = sind(aa(1));
   a. 1 √   b. 0   c. -1   d. error - not possible   e. some number that is not -1, 0, or +1

7. Which statement below will result in the variable y containing [1 3 5 7]?
   a. y = linspace(1,7,4);   b. y = oddnums(1,7);   c. y = 1 + 3 + 5 + 7;
   d. y = 1:4:7   **e. y=1:2:7** √

8. The command shown below will produce what text note on the current figure? >> Y = 2; text(2,2,'Y^2');
   a. Y2   b. Y^2   **c. Y²** √   d. 2^2   e. 4

9. Determine the value of a resulting from the following matlab code? >> x = [0 1 2 3 4]; y = [0 2 0 -2 0];
   a = x - y;
   a. 0   b. 2   c. 1   d. -1   **e. none of the above** √

10. What value does the variable q contain after the Matlab code below executes? >> x = 7; if x <= 3
    q = 0; elseif x > 10; q = 5; end
    a. 2.5   b. nothing - operation is not possible   c. 5   d. 0   **e. none of the above** √

Question II (15 Marks)
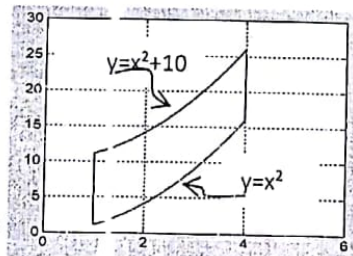a) Write a matlab script to plot figure 2 using matlab. (5 Marks)

Figure. 2

Solution

```
x=[1 1]; y=[1 11]; plot(x,y); x1=[4 4]; y1=[17 26]; plot(x1,y1);

ezplot('x^2+10',[1 4]); ezplot('x^2',[1 4]); text(1.5,25,'y=x^2+10'); text(4,7,'y=x^2');
```

b) For the polynomial $f = 3x^5+2x^4+100x^3+2x^2+7x+90$, it is required to: (5 Marks)
   1. Compute the derivative of f.
   2. Use integration to calculate the area enclosed by the lines $y = f(x)$, $y = 0$, $x = 0$, and $x = 3$.
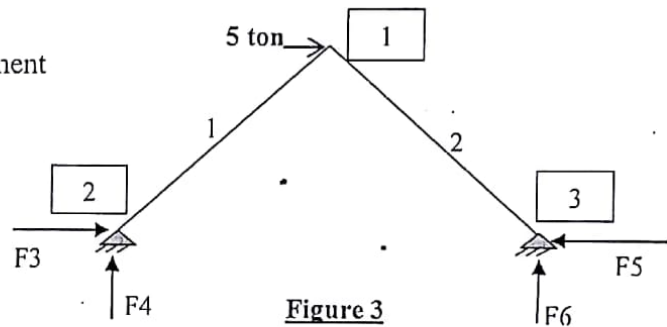   3. Use **solve** to find all critical points of f.

Solution

```
Syms x

y= 3*x^5+2*x^4+100*x^3+2*x^2+7*x+90;

   1.  Y1=diff(y);
   2.  Y2=int(y,0,3)
   3.  Y3=solve(y);
```

c) In the problem shown in Figure 3, each element is 5 m long.
Construct the matrix you would solve to find the forces in the elements. Use the element and node numbering shown in the figure. (5 marks)

solution

$\cos(60)=0.50$

$\sin(60)=0.866$

F1	F2	F3	F4	F5	F6	b
0.50	-0.50	0	0	0	0	-5
0.866	-0.866	0	0	0	0	0
0	0.50	0	0	-1	0	0
0	-0.866	0	0	0	1	0
-0.50	0	1	0	0	0	0
-0.866	0	0	1	0	0	0

AF = b

```
>> A = [0.50 -0.50 0 0 0 0; 0.866 -0.866 0 0 0 0; 0 0.50 0 0 -1 0; 0 -0.866 0 0 0 1; -0.50 0
1 0 0 0;
         -0.866 0 0 1 0 0 ];
>> b = [-5 0 0 0 0 0]'; F = A\b
```


Figure 3