

ME-2850 AU-17 MIDTERM 1

This is open books (MATLAB book, Numerical Methods book), closed notes examination

1. The following is a MATLAB program in a script file:

```
A = [4 0 2 -5 5 -3 9 -8 3 -6 2 -4]
n = length(A);
iL=1; iS=1;
L=A(1);
S=A(1);
for i = 2:n
    if A(i) > L
        L=A(i);
        iL=i;
    elseif A(i) < S
        S=A(i);
        iS=i;
    end
end
LVL=[L, iL]
SVL=[S, iS]
```

What is displayed in the Command Window when the program is executed?

2. The following is a user-defined MATLAB function.

```
function [D B] = TrToBi(T)
Dc=0;
for i = 1:5
    Dc = Dc+T(i)*3^(5-i);
end
D=Dc; 7
B(1:67)=0;
for i=1:7
    if 2^(7-i) > Dc
        B(i) = 0;
    else
        B(i)=1;
        Dc=Dc-2^(7-i);
    end
end
end
```

What is displayed in the Command Window when the following commands are entered?

```
>> V=[0 1 1 0 2];
>> [D B] = TrToBi(V)
```

3. Use the Secant Method for calculating the solution of the equation $0.4x^3 - 10\sqrt{x} - 2 = 0$
The first two estimates of the solution are $x_1 = 2$ and are $x_2 = 6$
Calculate the value of x in the first three iterations.
Determine the estimated relative error in the last solution.

4. The equation $e^{0.6x} - 2x^2 + 2x = 0$ has a solution between $x=1$ and $x=3$.

Use the fixed-point iteration method for calculating the solution.

For the first estimate of the solution use $x=3$.

Calculate the value of x in the next three iterations.