

ROSE-HULMAN INSTITUTE OF TECHNOLOGY

Department of Mechanical Engineering

ME123

Computer Applications I

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**EXAM 1 – WRITTEN PORTION**

NAME \_\_\_\_\_

SECTION NUMBER \_\_\_\_\_

CAMPUS MAILBOX NUMBER \_\_\_\_\_

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Multiple Choice	/40
Coding Problem	/60
Total	/100

ALL OF THESE PROBLEMS HAVE EQUAL WEIGHT

USE MATLAB SYNTAX FOR ALL PROGRAMS AND COMMANDS YOU WRITE

**Problem 1:**

Write a short program using a **for...end** loop to find the sum of the squares of the numbers from 5 to 10. Assign the answer to a variable called **total**. You do not need to print the answers with fprintf.

**Problem 2:**

Write a short program using a **for...end** loop to find the square roots of the numbers 0, 10, 20...200. You do not need to print the answers with fprintf.

**Problem 3:**

Write a short program using a **for...end** loop to put the angles 0, 10, 20...90 into an array called 'angle\_array'. The array should have 10 rows and 1 column. You do not need to print the answers with fprintf.

**Problem 4:**

Circle ALL of the file names that would be appropriate to use in Matlab. Appropriate files names will run and not result in errors.

- a) Lab 1 task 2.m
- b) 1sttaskforlab1.m
- c) plot.m
- d) MyName\_4.m
- e) plot\_lab1.m
- f) lecture-2-ex-3.m

**Problem 5:**

In MATLAB, an array  $A$  has been defined as follows:

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 9 & 11 & 13 \\ 2 & 4 & 6 \end{bmatrix}$$

For the MATLAB command  $y = A(3,1)$ , what does MATLAB output for  $y$ ?

**Problem 6:**

Using the same matrix  $A$  from problem 5, we now execute the following MATLAB commands:

$$\begin{aligned} B &= A'; \\ z &= B(2,3) \end{aligned}$$

What does MATLAB output for  $z$ ?

**Problem 7:**

For the following mathematical expression, write the MATLAB code for  $y$ . Use the MATLAB command for  $\pi$  and not 3.14159.

$$y = (x + \pi)^2$$

**Problem 8:**

When we run the MATLAB program shown below, an error statement appears in the Command window.

Here's the program:

```
% exampleProgram.m
%
% This program produces an mx1 array of angles named
% degrees and an mx1 array of the sines of the angles
% named sineAngle.

for angle = 0 : pi/10 : 2*pi
    degrees(row,1) = angle*180/pi;
    sineAngle(row,1) = sin(angle);
    row = row + 1;
end

% last line
```

Here's the error statement:

```
??? Undefined function or variable 'row'.

Error in ==> exampleProgram at 8
    degrees(row,1) = angle*180/pi;
```

Modify the program to correct the error.

**Problem 9:**

Consider the following piece of code:

```
fred = 1;  
for index = 1:3:8  
    fred = fred*index;  
end  
fred
```

What result will MATLAB produce in the Command window? (Circle one.)

- a) fred = 1
- b) fred = 7
- c) fred = 21
- d) fred = 28
- e) fred = 280
- f) Other: \_\_\_\_\_

**Problem 10:**

Consider the following piece of code:

```
index = 0;  
for count = 3:-1:1  
    index = index + 1;  
    A(1,index) = count;  
end  
A
```

What is A after the code is executed? (Circle one.)

- a) A = [1 2 3]
- b) A = [3 2 1]
- c) A =  $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$
- d) A =  $\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$
- e) A = [6]
- f) Other: \_\_\_\_\_