

**EXAM 1 – WRITTEN PORTION**

NAME \_\_\_\_\_

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

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Written Portion	/ 50
Computer Portion	/ 50
Total	/ 100

USE MATLAB SYNTAX FOR ALL PROGRAMS AND COMMANDS YOU WRITE

**Problem 1:**

(4 points) a. Circle all of the file names that will run and not result in errors.

- i. My\_first\_code!.m
- ii. HW3.1.m
- iii. Day2\_3.m
- iv. Good-code.m

b. Circle all of the variable names that should not be used in Matlab.

- i. data
- ii. cos
- iii. vector\_A
- iv. 2\_velocity

**Problem 2:**

(4 points) Write the Matlab code for the following mathematical expression.

$$\text{var} = 10 (e^{2x} - 1)$$

**Problem 3:**

(4 points) What is the value of  $y$  after the following program executes?

```
x = 5;  
y = x*z;  
z = 2;  
w = z*x + y;  
y = x + w;
```

- a.  $y = 60$
- b.  $y = 10$
- c.  $y = 65$
- d. other:  $y =$  \_\_\_\_\_
- e. the program crashes (gives an error message)

**Problem 4:**(4 points) What is the value of  $x$  after the following program executes?

```
x = 0;
for i = 0:1:2
    x = x + 2 * i;
end
```

- a.  $x = 10$
- b.  $x = 22$
- c.  $x = 7$
- d.  $x = 30$
- e. Other (explain): \_\_\_\_\_
- f. The program crashes.

**Problem 5:**(4 points) You are given a matrix called  $A$ :

$$A = \begin{bmatrix} 2 & 4 & 6 & 8 & 10 \\ 9 & 7 & 5 & 3 & 1 \end{bmatrix}$$

Consider the following code segment:

```
[m n] = size(A)
for i = 1:n
    A(2,i) = A(2,i) * i + A(1,i);
end
```

What is  $A$  after the code is executed?

- a.  $A = \begin{bmatrix} 2 & 4 & 6 & 8 & 10 \\ 8 & 12 & 18 & 22 & 26 \end{bmatrix}$
- b.  $A = \begin{bmatrix} 1 & 3 & 5 & 7 & 9 \\ 10 & 6 & 13 & 21 & 17 \end{bmatrix}$
- c.  $A = \begin{bmatrix} 2 & 5 & 8 & 11 & 14 \\ 9 & 7 & 4 & 3 & 1 \end{bmatrix}$
- d.  $A = \begin{bmatrix} 2 & 4 & 6 & 8 & 10 \\ 11 & 18 & 21 & 20 & 15 \end{bmatrix}$
- e.  $A = \begin{bmatrix} 2 & 4 & 6 & 8 & 10 \\ 11 & 18 & 21 & 4 & 2 \end{bmatrix}$
- f.  $A = \begin{bmatrix} 4 & 10 & 15 & 21 & 8 \\ 9 & 7 & 5 & 3 & 1 \end{bmatrix}$

**Problem 6:**

(4 points) You are given a matrix called  $A$ :

$$A = \begin{bmatrix} 1 & 4 & 5 & 9 \\ 6 & 2 & 2 & 8 \\ 7 & 5 & 2 & 4 \end{bmatrix}$$

- a. What will be printed by the following program? Write the output exactly as it would appear.

```
for i = 1:3
    fprintf('%2i \n', A(i,i))
end
```

- b. Where will the text be printed?
- To the screen
  - To a text file

**Problem 7:**

(4 points) Determine the value of `speed` after executing the following code segment:

```
speed = 20;
add = 5;
for i = 1:3
    speed = speed + add;
    add = 2 * add;
end
```

- `speed = 30`
- `speed = 35`
- `speed = 45`
- `speed = 55`
- Error – the program won't run.
- Other (explain): \_\_\_\_\_

**Problem 8:**

(4 points) Consider the following program written to store the cube of the first ten integers in a row vector  $y$ :

```
1   i = 0;
2   for x = 1:10
3       y(i) = x^3;
4       i = i + 1;
5   end
```

The numbers on the left indicate the line number. The above program does not fully execute. Circle the line of code at which MATLAB will return an error and explain why the error occurs. Reorder the lines of code to make the program work. Write your rearranged code below.

**Problem 9:**

(8 points) Write a short program using a for loop to add together all the even numbers between 200 and 300, inclusively. Assign the result to a variable called `total`. You do not need to print out the answer. Just write the code required to do the computation.

**Problem 10:**

(10 points) Write a short program using a for loop to generate two vectors,  $t$  and  $f$ , for plotting. The contents of the vector  $t$  should be values that start at 0 and end at 100 with steps of 5. The contents of the vector  $f$  should be a function of  $t$  as shown in the following equation:

$$f = 12\sin(6t)$$

You do not need to plot or print the vectors. Just write the code required to define them.