

**FORTTRAN Programming for Engineers**

Name: \_\_\_\_\_

SSN: \_\_\_\_\_

Signature: \_\_\_\_\_

If you want your grades posted, enter a 4 character code: \_\_\_\_\_

**Circle Lab Day and Circle Lab Time:**

Monday	Tuesday	Wednesday	Thursday	Friday
	8:00	1:00	3:00	

Your test should have twelve (12) questions on eight (8) pages, including this title page. The test is divided into two parts. The first part consists of ten (10) multiple choice questions, each worth five (5) points. The second part consists of two (2) write code questions, worth twenty (20) and thirty (30) points each. No calculators may be used during the exam. You have fifty minutes to complete this test. Use your time wisely. Good Luck!!! **Note: None of your questions can be answered during the final 10 minutes of the test.**

SCORE:	<u>Possible</u>	<u>Points</u>
Part 1	50 pts	_____
Question 11	20 pts	_____
Question 12	30 pts	_____
<hr/>		
TOTAL:	100 pts	_____

PART ONE. Each question is worth 5 points each. **Place your answers on the line near the question number.** You may assume there are no syntax errors in any code fragment except when explicitly asking for syntax errors. Also, any undeclared variables are of type integer.

\_\_\_ 1. Given the following declaration statements:

```
logical weather  
parameter (weather = .true.)  
real x, y
```

For what values of x and y will the following condition be true?

```
(y .gt. x) .and. (.not. weather)
```

- a. When  $y > x$
- b. When  $x > y$
- c. It is always true.
- d. It is never true.
- e. None of the above.

\_\_\_ 2. Given the following code:

```
real x, y, z  
integer a  
parameter (a = 10)  
  
if (x .lt. a) then  
    y = x**2  
    z = sqrt(y)  
else  
    z = a  
end if
```

Which of the following statements is true?

- a. When x is greater than or equal to 10, then  $z = 10$  and when x is less than 10, then  $z = x$
- b. When x is greater than or equal to 10, then  $z = x$  and when x is less than 10, then  $z = 10$
- c. When x is greater than or equal to 10, then  $z = 10$

- d.      and when  $x$  is less than 10, then  $z = y$   
None of the above.

\_\_\_\_\_ 3. What is output by the following code?

```
integer x, y, z

x = 0
y = 5
z = 1

if (x .eq. y) then
    if (x .lt. 0) then
        z = z + 1
    else
        z = z - 1
    endif
else
    if (x .ne. 0) then
        z = z + 2
    else
        z = z - 2
    endif
endif

print *, z
```

- |    |    |    |   |
|----|----|----|---|
| a. | -1 | b. | 0 |
| c. | 1  | d. | 2 |
| e. | 3  |    |   |

\_\_\_\_\_ 4. What is output by the following code?

```
integer i, j, k

i = 3
j = 0

do 10 k = 1, i, -1
    j = j + 1
10 continue

print *, j
```

a. 4  
c. 2  
e. 0

b. 3  
d. 1

\_\_\_\_ 5. What is output by the following code? Assume **fee** and **speed** are both integers with values of fee = 0 and speed = 75.

```
if (speed .gt. 35) then
  fee = 20
else if (speed .gt. 50) then
  fee = 40
else if (speed .gt. 65) then
  fee = 60
end if
print *, speed
```

- |    |                    |    |    |
|----|--------------------|----|----|
| a. | 0                  | b. | 20 |
| c. | 40                 | d. | 60 |
| e. | None of the above. |    |    |

\_\_\_\_ 6. Consider the following program:

```
program prog
integer i, j, k, l, m, n
read *, i, j
read *, k, l, m
read *, n
print i, j, k, l, m, n
end
```

Assume the content of the file "data" is as follows:

```
1 2 3 4 5
6 7
8 9 10
11 12
13 14
```

What does the program print **on the terminal screen** when the program is run using the following command? (Assume the program is compiled correctly to the file "a.out".)

```
a.out < data
```

- |    |              |
|----|--------------|
| a. | 1 2 6 7 8 11 |
| b. | 1 2 3 4 5 6  |

- c. 1 2 6 7 8 9
- d. Nothing, because the output is written into the file "out".
- e. None of the above.

\_\_\_ 7. What is output by the following code?

```

print *, 'Hello'
do 10 i = 5, 2, -2
    print *, 'i = ', i
10 continue
print *, 'Bye'
```

- |    |  |    |   |
|----|--|----|---|
| a. | Hello<br>i = 5<br>Hello<br>i = 3<br>Bye        | b. | Hello<br>i = 5<br>i = 3<br>i = 1<br>Bye |
| c. | Hello<br>i = 5<br>Bye<br>Hello<br>i = 3<br>Bye | d. | Hello<br>i = 5<br>i = 3<br>Bye          |
| e. | None of the above                              |    |   |

\_\_\_ 8. What is output by the following code? Assume **sum** and **i** are integer variables.

```

sum = 0
i = 1
do while (i .le. 15)
    if (i .lt. 5) then
        sum = sum + 1
    end if
    if (i .lt. 10) then
        sum = sum + 2
    end if
    if (i .lt. 15) then
        sum = sum + 3
    end if
    i = i + 3
end do
print *, sum
```

- a. 10
- c. 23
- e. None of the above.

- b. 13
- d. 26

\_\_\_\_ 9. Which of the following condition expressions evaluate to true?  
Assume  $\text{val1} = 5$ ,  $\text{val2} = 10$  and  $\text{val3} = 15$ .

- (1)  $\text{val1} .\text{lt. val2 .and. val2 .eq. 7 .or. val3 .ne. 15}$
  - (2)  $\text{val1 .gt. 10 .and. val3 .eq. val2 + val1 .or. val2 .eq. val1}$
  - (3)  $\text{val1 .gt. val3 - val1 .and. val2 .lt. val1 .or. val2 .eq. val1 * 2}$
- a. Expression (1) only
  - b. Expression (2) only
  - c. Expression (3) only
  - d. Expressions (2) and (3)
  - e. Expression (1), (2) and (3)

\_\_\_\_ 10. What does the following expression evaluate to? Assume the variable **a** is of type integer and has value of 7, and variable **b** is of type real and has value of 3.3.

$$a/2 + 4 * b/3$$

- a. 8.25
- b. 7.4
- c. 7.7
- d. 7.9
- e. None of the above.

PART TWO. This part consists of one short answer and one write code question. This part is worth a total of fifty (50) points.

11. (20 points) Define what a syntax error is and how syntax errors are detected.

Find all of the syntax errors in the following program and explain why each one is a syntax error.

```
program findit

implicit none
integer a, b
parameter (a = 10,000, b = 400)
real x y z w

print*, 'Type in a number'
read *, x, w

print 35, 'Type in another number'
read *, y

z = (a+b) * (x/y) ** 2
w = |z|

print *, 'The result is ', w

stop
```

12. Write a complete program that will read in 5 integer values, then determine the two largest values of the 5 input values and finally print out these two largest values. Your program must prompt the user to inform how the input must be entered and must echo the input. All output must be printed in some readable manner. You do not have to write comments or a header block for this program. (30 points)