

Instructions:

1.

Answer all questions on this paper. For multiple choice questions, circle the letter of the *best* choice. For short answer questions, write your answer in the space provided.
2.

Extra work space is available on the last page.
3.

No aids (such as calculators or cell phones) are permitted.
4.

You have 60 minutes to complete the exam.
5.

Marks total to 20. Marks for each question are shown in the heading.

Marks for Part 1	Part 2	Part 3		Total
/ 5	/ 5	/ 10		/20

Part 1: Predict the output [5 x 1 mark]

In each row of the table below, mentally execute the code fragment on the left and enter the expected output in the box on the right. Each table row is separate. Use the last page for scrap work.

	<i>Code Fragment</i>	<i>Expected output</i>
A.	<pre>print ('Sun', 'Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat')[-6:3]</pre>	<pre>('Mon', 'Tue')</pre>
B.	<pre>print 1 / 2 != 3 and 2</pre>	<pre>2</pre>
C.	<pre>print range(3,2,-1)</pre>	<pre>[3]</pre>
D.	<pre>jj = 2 while (jj < 12) : if jj % 5 == 1 : print jj jj = jj + 1</pre>	<pre>6 11</pre>
E.	<pre>print [jj * jj for jj in range(4)]</pre>	<pre>[0, 1, 4, 9]</pre>

Work space:

Part 2: Circle the letter of the *best* answer [5 x 1 mark]

A. Which of the following conversions will display the given number in scientific notation, right-justified, with 3 digits after the decimal point?

- a) "%g" % 6.23
- b) "%-10.3e" % 6.23
- c) "%3.f" % 6.23
- d) "%12.3e" % 6.23
- e) "%-12.3f" % 6.23

B. For which of the following is the Python language named?

- a) A large jungle snake.
- b) A travelling road show with animals and acrobats.
- c) A comedy TV program.
- d) An aerobatic group thrilling audiences with death-defying acts.
- e) An entrepreneur who developed entertainment acts.

C. Given the following definition, which function call below will result in an error?

```
def fnc(varX, varY) :
    return varX + varY
```

- a) print fnc(5, "kg")
- b) print fnc("Jack and", "Jill")
- c) print fnc(range(3), ["Jill"])
- d) print fnc(tuple(range(3)), ("Jill",))
- e) print fnc(7.2, True)

D. Which of the following statements would print the most asterisks?

- a) for jj in range(19, 0, -1) : print "*"
- b) for jj in range(20) : print "*"
- c) for jj in range(0, 37, 2) : print "*"
- d) print 19 * "*" "
- e) print "*" * " * 5, 3 * "*" * " "

E. Which of the following statements about tuples and lists is **true**?

- a) A tuple cannot contain a list as an entry.
- b) A list cannot contain a tuple as an entry.
- c) Tuples and lists differ only in the type of brackets they use, "(" for tuples, "[" for lists.
- d) Tuples and lists are very similar, but a list can be changed and a tuple cannot.
- c) Tuples and lists are very similar, but a tuple can be changed and a list cannot.

Part 3: Write a program [10 marks]

Write a function `sumDivisors` that determines the divisors of a number and returns the total. For example, the divisors of 6 are 1, 2, 3 and the total is $1+2+3=6$. The number 6 is called a *perfect number* because the sum of its divisors equals itself.

After your function definition, write Python instructions that will ask a user to specify an integer limit, and that will then print out a statement about divisors for each number up to that limit.

Sample output:

```
Welcome to Divisor Checker
Enter a limit on numbers to check: 8

Finding perfect numbers up to 8
The sum of the divisors of 1 is 0
The sum of the divisors of 2 is 1
The sum of the divisors of 3 is 1
The sum of the divisors of 4 is 3
The sum of the divisors of 5 is 1
6 is a perfect number
The sum of the divisors of 7 is 1
```

Details:

- Total only divisors less than `nn`.
- Assume the user enters a positive integer.
- Write either the sum of the divisors, or the statement "`__ is a perfect number`", but not both.

```
def sumDivisors(nn) :
    "Finds all divisors of integer nn (not including nn) and returns their sum"

    total = 0
    for num in range(1,nn) :
        total += num * (nn % num == 0)
    return total


print "Welcome to divisor checker"
userInput = raw_input("Enter a limit on numbers to check: ")
limit = int(userInput)

print "\nFinding perfect numbers up to %d" % limit
for num in range(1,limit) :
    total = sumDivisors(num)
    if total == num :
        print "%d is a perfect number" % num
    else :
        print "The sum of the divisors of %d is %d" % (num, total)
```

This page is intentionally left blank except for the header and this message.