HORIZON

2021-2022

M1

TEST

LAB for Mathematics

(Time Allowed: xx minutes)

Note:

- The use of calculators is NOT permitted.
- Compare the exam version number on the Teleform sheet supplied with the version number above. If they do not match, ask the exam supervisor for a new sheet.
- Enter your name and student ID on the Teleform sheet. Your name should be entered left aligned. If your name is longer than the number of boxes provided, truncate it.
- Answer ALL **Multiple-choice** questions on the Teleform answer sheet provided.
- Use a dark pencil to mark your answers in the multiple choice answer boxes on the Teleform sheet. Check that the question number on the sheet corresponds to the question number in this question/answer book. If you spoil your sheet, ask the supervisor for a replacement.

The `Square` class below is used by the following EIGHT questions.

```
class Square:
    def __init__(self, s):
        self.side = s

    def perimeter(self):
        return 4*self.side

    def area(self):
        return self.side * self.side

    def scale(self, factor):
        self.side *= factor

    def __le__(self, other):
        if not isinstance(other, Square):
            return False
        return self.area() <= other.area()

    def __ne__(self, other):
        if not isinstance(other, Square):
            return False
        return self.area() != other.area()

    def __eq__(self, other):
        if not isinstance(other, Square):
            return False
        return self.area() == other.area()
```

Question 1
[1 mark] Consider the extra lines of code:

```
r = Square(5)
s = Square(10)
```

Which of the following code fragment will have **`False`** as output?

(a) `print(r == s)`
(b) `print(r.area())`
(c) `print(r.perimeter())`
(d) `print(r <= s)`
(e) None of the above

Question 2
[1 mark] Consider the extra lines of code:

```
r = Square(5)
s = Square(10)
t = Square(2)
u = Square(4)
```

Which of the following code fragment will cause a `TypeError` exception?

(a) `print(s.area())`
(b) `print(u < s)`
(c) `print(t.perimeter())`
(d) `print(r == u)`
(e) None of the above

Question 3
[1 mark] What is the output of the following code fragment?

```
r = Square(5)
s = Square(10)
r.scale(2)
print(r != s, r.area())
```

(a) `False 100`
(b) `True 25`
(c) `True 100`
(d) `False 25`
(e) None of the above

Question 4
[1 mark] What is the output of the following code fragment?

```
r = Square(5)
s = Square(10)
t = Square(4)
u = Square(6)
print(r != s, s <= r, u <= t)
```

(a) `True True False`
(b) `True False False`
(c) `False True False`
(d) `False False True`
(e) None of the above

Question 5
[1 mark] What is the output of the following code fragment?

```
r = Square(5)
s = Square(10)
u = r
print(r != s, r is not s, s is u, s != u)
```

(a) `False True False True`
(b) `True False True True`
(c) `True False False False`
(d) `True True False True`
(e) None of the above

Question 6
[1 mark] What is the output of the following code fragment?

```
r = Square(5)
s = Square(10)
a = [r, s]
b = a.copy()
print(a != b, a is b, a[0] != b[0], a[0] is not b[1])
```

(a) `True False True False`
(b) `False False False True`
(c) `True False True True`
(d) `False True False True`
(e) None of the above

Question 7
[1 mark] What is the output of the following code fragment?

```
from copy import deepcopy
r = Square(10)
s = Square(5)
a = [r, s]
b = deepcopy(a)
print(a == b, a is not b, a[0] != b[1], a[0] is b[0])
```

(a) `True True True False`
(b) `True False True False`
(c) `True False True True`
(d) `True True False False`
(e) None of the above

Question 8
[1 mark] What is the output of the following code fragment?

```
r = Square(5)
print(r != 5)
```

(a) `None`
(b) `AttributeError: 'int' object has no attribute 'area'`
(c) `False`
(d) `True`
(e) None of the above

Question 9
[1 mark] What is the output of the following code fragment?

```
my_list = [2*x - 1 for x in range(1,11) if x % 2 != 0]
print(my_list)
```

(a) `[2, 6, 10, 14, 18]`
(b) `[3, 7, 11, 15, 19]`
(c) `[1, 5, 9, 13, 17, 19]`
(d) `[1, 5, 9, 13, 17]`
(e) None of the above

Question 10
[1 mark] What is the output of the following code fragment?

```
x = [1, 2, 3, 4]
y = x + [5]
x += [5]
print(x == y)
```

(a) `True`
(b) `[1, 2, 3, 4]`
(c) `False`
(d) `[1, 2, 3, 4, 5]`
(e) None of the above

Question 11
[1 mark] Consider the following code:

```
class Fraction:
    def __init__(self, top, bottom):
        self.num = top             #numerator
        self.den = bottom          #denominator

    def __str__(self):
        return str(self.num) + '/' + str(self.den)
```

Which of the following statement will produce `2/3` as an output?

(a) `Fraction(2,3)`
(b) `str(Fraction(2,3))`
(c) `print(Fraction(2,3))`
(d) `print(Fraction(2/3))`
(e) None of the above

The `testing` function below is used by the following THREE questions:

```
def testing(a,b):
    try:
        result = a / b
    except ZeroDivisionError:
        print('ZeroDivisionError raised here')
    except NameError:
        print('NameError raised here')
    except TypeError:
        print('Type error')
    except:
        print('Error raised here')
    else:
        print('Else clause')
```

Question 12
[1 mark] What is the output of the statement `testing(2,2)`given the `testing` function above?

(a) `Error raised here`
(b) `Else clause`
(c) `ZeroDivisionError raised here`
(d) `Type error`
(e) None of the above

Question 13
[1 mark] What is the output of the statement `testing(2,0)` given the `testing` function above?

(a) `Type error`
(b) `Error raised here`
(c) `ZeroDivisionError raised here`
(d) `Else clause`
(e) None of the above

Question 14
[1 mark] What is the output of the statement `testing('a',0)`given the `testing` function above?

(a) `ZeroDivisionError raised here`
(b) `Else clause`
(c) `Error raised here`
(d) `Type error`
(e) None of the above

ANSWERS – Version 00000001

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