UNIRAZAK
UNIVERSITI TUN ABDUL RAZAK

FINAL EXAMINATION

MARCH 2024

COURSE TITLE **OBJECT-ORIENTED PROGRAMMING**

COURSE CODE **RCIT3633**

DATE/DAY **20 JUNE 2024 / THURSDAY**

TIME/DURATION **09:00 AM - 11:00 AM / 02 Hour(s) 00 Minute(s)**

INSTRUCTIONS TO CANDIDATES :

1. Please read the instruction under each section carefully.
2. Candidates are reminded not to bring into examination hall/room any form of written materials or electronic gadget except for stationery that is permitted by the Invigilator.
3. Students who are caught breaching the Examination Rules and Regulation will be charged with an academic dishonesty and if found guilty of the offence, the maximum penalty is expulsion from the University.

(This Question Paper consists of **8** Printed Pages including front page)

*****DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO*****

This question paper contains TWO (2) sections in this examination paper. Please answer ALL questions in the answer booklet. [50 MARKS]

SECTION A (20 Marks)

There are TWENTY (20) questions on this part of the examination paper. Answer ALL questions in the answer booklet.

1. Given the following four patterns:

Pattern A
```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
1 2 3 4 5 6
```

Pattern B
```
1 2 3 4 5 6
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

Pattern C
```
          1
        2 1
      3 2 1
    4 3 2 1
  5 4 3 2 1
6 5 4 3 2 1
```

Pattern D
```
1 2 3 4 5 6
  1 2 3 4 5
    1 2 3 4
      1 2 3
        1 2
          1
```

Which of the above patterns is produced by the following code?

```
for i in range(1, 6 + 1):
    for j in range(6, 0, -1):
        print(j if j <= i else " ", end = " ")
    print()
```

A. Pattern A
B. Pattern B
C. Pattern C
D. Pattern D

2. Which of the following is **NOT** a valid variable name in Python?

A. `my_variable`
B. `3variable`
C. `_variable`
D. `variable_3`

3. Which of the following data types is **MUTABLE** in Python?

A. `int`
B. `str`
C. `tuple`
D. `list`

4. What is the output of the following code snippet?

```
my_list = [1, 2, 3, 4, 5]
print(my_list[2:4])
```

A. `[2,3,4]`
B. `[3,4]`
C. `[2,3]`
D. `[3,4,5]`

5. Suppose `list1= [1, 3, 2, 4, 5, 2, 1, 0]`. What is `list1[0:]`?

A. `0`
B. `[1, 3, 2, 4, 5, 2, 1]`
C. `[1, 3, 2, 4, 5, 2]`
D. `[1, 3, 2, 4, 5, 2, 1, 0]`

6. What is the Python code to shuffle `list1`?

A. `list1.shuffle()`
B. `shuffle(list1)`
C. `random.shuffle(list1)`
D. `random.shuffleList(list1)`

7. What will be displayed by the following code?

```
myList = [1, 2, 3, 4, 5, 6]
for i in range(1, 6):
    myList[i - 1] = myList[i]

for i in range(0, 6):
    print(myList[i], end = " ")
```

A. 2 3 4 5 6 1
B. 6 1 2 3 4 5
C. 2 3 4 5 6 6
D. 1 1 2 3 4 5

8. What does the '`range()`' function in Python return?

A. A list of numbers
B. A tuple of numbers
C. An iterator of numbers
D. A dictionary of numbers

9. Select **THREE (3)** parts that are absolutely needed to create and call a function.

I. Function header (including the definition and the name)
II. Function body
III. Variables
IV. Return statement
V. Function call

A. I, II and III only
B. I, III and IV only
C. I, III and V only
D. I, II and V only

10. In Python, which of the following is used to terminate the current loop iteration and move to the next iteration?

A. `break`
B. `stop`
C. `skip`
D. `continue`

11. What would be the output for Python code below? (Note: Ignore whitespaces)

```
class A:
    def __init__(self):
        self.x = 5

class B(A):
    def __init__(self):
        super().__init__()

obj = B()
print(obj.x)
```

A. 5
B. None
C. Error: 'B' object has no attribute 'x'
D. Error: `super()` function not defined

12. Which of the following is **NOT** a principle of Object-Oriented Programming?

A. Inheritance
B. Encapsulation
C. Polymorphism
D. Recursion

13. In Python, what is the purpose of the `'self'` parameter in class methods?

A. It refers to the current instance of the class
B. It is used to pass arguments to the method
C. It is a placeholder for future method parameters
D. It is required to define the class as a method

14. "Arguments are passed in the order of parameters. The order defined in the order function declaration ". Which of the following term **BEST** match with the description?

A. Positional arguments
B. Keyword arguments
C. Default arguments
D. Variable-length arguments

15. Which of the following is **INCORRECT**?

A. The variables used inside function are called local variables.
B. The local variables of a particular function can be used inside other functions, but these cannot be used in global space.
C. The variables used outside function are called global variables.
D. In order to change the value of global variable inside function, keyword global is used.

16. What will the output for the following Python code?

```
class MyClass:
    def __init__(self, x):
        self.x = x

obj = MyClass(5)
print(obj.x)
```

A. 5
B. None
C. MyClass(5)
D. Error: MyClass object has no attribute 'x'

17. What will the output for the following Python code?

```
class A:
    def __init__(self):
        self.x = 5

class B(A):
    def __init__(self):
        super().__init__()
        self.y = 10

obj = B()
print(obj.x, obj.y)
```

A. 5 10
B. 10 5
C. 5 None
D. Error: 'B' object has no attribute 'y'

18. What will be the output for the following Python code?

```
class A:
    def __init__(self, x):
        self.x = x

class B(A):
    def __init__(self, y):
        super().__init__(y)

obj1 = A(5)
obj2 = B(10)
print(obj1.x, obj2.x)
```

A. 5 10
B. None None
C. Error: 'B' object has no attribute 'x'
D. Error: 'A' object has no attribute 'x'

19. What is method overriding in Python?

A. Defining a method with the same name as a built-in method
B. Calling a method from within another method of the same class
C. Redefining a method in a subclass with the same name as in the superclass
D. Defining multiple methods with the same name in a class but with different parameter

20. Which of the following is the **MOST** suitable definition for encapsulation?

A. Focuses on variables and passing of variables to functions.
B. Ability of a class to derive members of another class as a part of its own definition.
C. Allows for implementation of elegant software that is well designed and easily modified.
D. Means of bundling instance variables and methods in order to restrict access to certain class members.

SECTION B **(30 Marks)**

There are TWO (2) questions in this part of the examination paper. Answer ALL questions in the answer booklet.

1. Functions in Python programming language can make programs to be modular and reusable as it is one of the central goals in software engineering.

   a) Define **FIVE (5)** functions definition headers called as `enterOption`, `enterData`, `kilogramToGram`, `gramToKilogram` and `displayConversionResult`. The `enterOption` function has no parameter while `enterData`, `kilogramToGram`, `gramToKilogram`, and `displayConversionResult` functions contains parameter(s). (5 marks)

   b) Write the body for each function based on the description below:

      i. The `enterOption` function is a value returning function that gets and validates the option to either convert from kilogram to gram or vice-versa. The option input will be repeated until a correct option is entered by the user. (3 marks)

      ii. The `enterData` function is a value returning function that gets the data from the user based on the option entered. (2 marks)

      iii. The `kilogramToGram` function is a value returning function that calculates the conversion from kilogram to gram based on the formula. (1 marks)

      iv. The `gramToKilogram` function is a value returning function that calculates the conversion from gram to kilogram based on the formula. (1 marks)

      v. The `displayConversionResult` function is a void function that displays the conversion result based on the option entered in `enterOption` function. (1 marks)

   c) Write the main program that contains the functions caller. (2 marks)

2. Object-oriented programming enables users to develop large-scale software effectively that uses objects to create programs. An object represents an entity in the real world that can be distinctly identified based on its identity, state and behavior.

   a) Write a Python parent class on the description below:

      i. The Python parent class is called `GeometricObject` with attribute `color` type `string` and default value is `Red`.
      ii. Constructor method that initializes the attributes values.
      iii. `getColor()` and `setColor()` methods that returns `color` and assign `color` respectively of an object created via the `GeometricObject` class.

      (4 marks)

   b) Write a Python child class based on the description below:

      i. The Python child class is called `Circle` which inherits from the parent class, and which also has a `radius` attribute.
      ii. Constructor method that initializes the attributes values.
      iii. `getRadius()`, `setRadius()`, and `getArea()` methods that returns `radius`, assign `radius` and returns `area` of an object created via the `Circle` class.

      (4 marks)

   c) Write a Python test program based on the following sample output and description:

      i. A `GeometricObject` object via an instantiation on the `GeometricObject` class and then test the `getColor` method.
      ii. An `Circle` object via an instantiation on the `Circle` class and then test the `getArea()` and `getRadius()` method.

```
The color is Red
The radius is 5
The area is 78.55
```

      (7 marks)

***** END OF QUESTION PAPER *****