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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**  
(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech (Integrated)

**SEM: II - THEORY EXAMINATION (2022-2023 )**

**Subject: Problem Solving using Advanced Python**

**Time: 3 Hours**

**Max. Marks: 100**

**General Instructions:**

**IMP:** Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

**SECTION A**

**20**

**1. Attempt all parts:-**

- 1-a. Which of the following is type of namespace? (CO1) 1
- (a) Enclosing
  - (b) Global
  - (c) built-ins
  - (d) All of the above
- 1-b. What will be the output of the following python code? (CO1) 1
- ```
def say(message, times = 1):
    print(message * times)
say('Hello')
say('world', 5)
```
- (a) Hello  
world  
world  
world  
world  
world

- (b) Hello world, 5
- (c) error
- (d) None of the above

1-c. Which of the following statements is wrong about inheritance? (CO2) 1

- (a) Protected members of a class can be inherited
- (b) The inheriting class is called a subclass
- (c) Private members of a class can be inherited and accessed
- (d) Inheritance is one of the features of OOP

1-d. What will be the output of the following Python code? (CO2) 1

```
class A:
    def test(self):
        print("test of A called")
class B(A):
    def test(self):
        print("test of B called")
        super().test()
class C(A):
    def test(self):
        print("test of C called")
        super().test()
class D(B,C):
    def test2(self):
        print("test of D called")
obj=D()
obj.test()
```

- (a) test of B called  
test of C called  
test of A called
- (b) test of C called  
test of B called
- (c) test of B called  
test of C called
- (d) Error, all the three classes from which D derives has same method test()

1-e. What will be the output of the following Python code? (CO3) 1

```

odd=lambda x: bool(x%2)
numbers=[n for n in range(10)]
print(numbers)
n=list()
for i in numbers:
    if odd(i):
        continue
    else:
        break

```

- (a) [0, 2, 4, 6, 8, 10]
- (b) [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
- (c) [1, 3, 5, 7, 9]
- (d) Error

1-f. The single line equivalent of the following Python code? (CO3) 1

```

l=[1, 2, 3, 4, 5]
def f1(x):
    return x<0
m1=filter(f1, l)
print(list(m1))

```

- (a) filter(lambda x:x<0, l)
- (b) filter(lambda x, y: x<0, l)
- (c) filter(reduce x<0, l)
- (d) reduce(x: x<0, l)

1-g. How pack() function works on tkinter widget ? (CO4) 1

- (a) According to x,y coordinate
- (b) According to row and column-wise
- (c) According to left,right,up,down
- (d) None of the above

1-h. Is it possible to draw a circle directly in tkinter canvas ? (CO4) 1

- (a) Yes
- (b) No
- (c) No(but possible by oval)
- (d) None of the above

1-i. Which of the following is/are ways to create data frames? (CO5) 1

- (a) create by using list of dictionary
- (b) create by using dictionary with list
- (c) create by using series
- (d) All of the mentioned

- 1-j. Identify the right type of chart using the following hints. (CO5) 1  
 Hint 1: This chart is often used to visualize a trend in data over intervals of time.  
 Hint 2: The line in this type of chart is often drawn chronologically
- (a) Line chart
  - (b) Bar chart
  - (c) Pie Chart
  - (d) Scatter plot

**2. Attempt all parts:-**

- 2.a. Differentiate between class variable and instance variable. (CO1) 2
- 2.b. How abstract method is different from the concrete method? (CO2) 2
- 2.c. What is the difference between an Iterator and Iterable? (CO3) 2
- 2.d. How to resize an image using tkinter? (CO4) 2
- 2.e. Write code to print 4 integers random numbers range between 1 To 15. (CO5) 2

**SECTION B**

**30**

**3. Answer any five of the following:-**

- 3-a. What is encapsulation in python and what are the different benefits provided by encapsulation? (CO1) 6
- 3-b. Write a program to create a class called Complex and write a menu driven program to read, display, add and subtract two complex numbers by creating corresponding instance methods. (CO1) 6
- 3-c. What is method overriding? Explain it with an example. (CO2) 6
- 3-d. Write names of the special functions to overload the assignment operators in python. (CO2) 6
- 3.e. What is iterator? Also write a program that generate an iterator to print odd numbers from 1-20. (CO3) 6
- 3.f. Give syntax of int\_slider, float\_slider, int\_range\_slider and float\_range\_slider in Ipywidgets. (CO4) 6
- 3.g. How can you initialize a 4\*4 numpy array with only ones? Reshape this into 2\*8 array. (CO5) 6

**SECTION C**

**50**

**4. Answer any one of the following:-**

- 4-a. Explain object oriented programming concept in python with proper example. 10  
(CO1)
- 4-b. Write a program that has a class Point with attributes x and y. (CO1) 10
- a. Write a method called midpoint that returns a midpoint of a line joining two points.
- b. Write a method called length that returns the length of a line joining two points.

**5. Answer any one of the following:-**

- 5-a. What is method resolution order (MRO)? Explain the principles followed by MRO with example? (CO2) 10
- 5-b. What is Code Introspection ? Explain any five built-in functions that are used for code introspection in python. (CO2) 10

**6. Answer any one of the following:-**

- 6-a. What is generator, explain the use of generator expression with example. Also give the advantage of Generator. (CO3) 10
- 6-b. Explain the following:- (CO3) 10
- i) Closure
- ii) Decorators

**7. Answer any one of the following:-**

- 7-a. Write a program to display a menu on the menu bar. Write a program to display a pop-up dialog box. (CO4) 10
- 7-b. Write a program to display two buttons and print a message when a button is clicked. Write a program to display a text on the console when a button is pressed. (CO4) 10

**8. Answer any one of the following:-**

- 8-a. Write a program to create Bar plot and box plot using Matplotlib take your own data to draw these plot. (CO5) 10
- 8-b. What is a DataFrame in pandas and also write a program to read data from student.csv file with attributes Student\_Name , Student\_Marks and Roll\_Number . Calculate average marks, minimum marks and maximum marks of student using dataframe. (CO5) 10