

**PYTHON PROGRAMMING**  
(DSC2101)

Time Allotted : 2½ hrs

Full Marks : 60

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and  
any 4 (four) from Group B to E, taking one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A**

1. Answer any twelve:

12 × 1 = 12

*Choose the correct alternative for the following*

- (i) What is the output of below program?  

```
def say(message, times = 1):
    print(message * times , end = ' ')
    say('Hello and')
    say('World', 5)
```

 (a) Hello andWorldWorldWorldWorldWorld  
 (b) Hello and World 5  
 (c) Hello and World,World,World,World,World  
 (d) Hello and HelloHelloHelloHelloHello
- (ii) Find and write the output of the following python code:  

```
a=10
def call():
    global a
    a=15
    b=20
    print(a)

call()
```

 (a) 25  
 (b) 35  
 (c) 15  
 (d) 10
- (iii) What is the output of the following code:  

```
A,B=3,4
C=A>B
Print(C)
```

 (a) True  
 (b) False  
 (c) error  
 (d) Boolean
- (iv) What is the output of the following code:  

```
A,B=3,4
C=A>B
Print(C)
```

 (a) True  
 (b) False  
 (c) error  
 (d) Boolean
- (v) What will be the output of the following code:  

```
l1=[1,2,3]
l1.insert(2,25)
print(l1)
```

 (a) [1,2,3,25]  
 (b) [1,25,2,3]  
 (c) [1,2,25,3]  
 (d) [25,1,2,3,6]
- (vi) What will be the output of the following code?  

```
d1={'rohit':56,"Raina":99}
print("Raina" in d1)
```

 (a) True  
 (b) False  
 (c) No output  
 (d) Error
- (vii) What will be the output of the following code snippet?  

```
import numpy as np
x = np.array([1, 2])
np.tile(x,(2,2))
```

 (a) array([1, 2, 1, 2])  
 (b) array([1, 2])  
 (c) array([[1, 2, 1, 2], [1, 2, 1, 2]])  
 (d) None of the above

- (viii) What is a correct syntax to check the number of dimensions in an array arr?  
 (a) arr.ndim() (b) arr.dim  
 (c) arr.dim() (d) arr.ndim
- (ix) Which of the following is the correct way to initialize the Tkinter main window?  
 (a) tk.MainWindow() (b) tk.Init()  
 (c) tk.Tk() (d) tk.Window()
- (x) Which of the following is used to start the Tkinter event loop so that the GUI window remains open?  
 (a) root.pack() (b) root.mainloop()  
 (c) root.show() (d) root.run()

Fill in the blanks with the correct word

- (xi) To convert a string to an integer in Python, you use the function \_\_\_\_\_().
- (xii) To combine two strings str1 and str2, you use the \_\_\_\_\_ operator.
- (xiii) To create a dictionary, key-value pairs are separated by \_\_\_\_\_ (Fill the blank)
- (xiv) To create an identity matrix in NumPy we use \_\_\_\_\_ method.
- (xv) In Python, the special method \_\_\_\_\_ is used as a constructor to initialize object attributes when an object is created.

### Group - B

2. (a) Write a program that has a class Student that stores stdid, name, and marks of three subjects, Average marks and Grade of the students. The class has two variables college\_name which stores name of the college and student\_count which gives information about total number of students. Display college\_name, total number of students, Student information along with all marks and print Grade based on average Marks. if(average >= 90): grade='O', if (average < 90 and average >= 80): grade='A', if(average < 80 and average >= 70): grade='B', if(average < 70 and average >= 60): grade='C', if(average < 60 and average >= 50): grade='D' else: grade='F'. [[CO3](Analyze/IOCQ)]
- (b) Write a python program to find the maximum, minimum and average of three numbers without using library functions. [[CO2](Understand/IOCQ)]  
**8 + 4 = 12**
3. (a) Write a python program to print fibonacci series of n number using recursion. [[CO2](Understand/LOCQ)]
- (b) What do you mean by default argument to a function? Write syntax. [[CO2](Understand/LOCQ)]
- (c) Write a python code to show use of global keyword in python. [[CO1](Understand/LOCQ)]
- (d) With help of an example explain the significance of the init() method of class. [[CO3](Understand/LOCQ)]
- (e) Write the syntax of range() function in python, with example. [[CO2](Understand/LOCQ)]  
**3 + 2 + 3 + 2 + 2 = 12**

### Group - C

4. (a) Given the participant's score sheet for your College Sports Day, you are required to find the runner-up score. You are given scores. Store them in a list and find the score of the runner-up. Hint : Given list is [10,3,5,6,10,6]. The maximum score is 10, second maximum is 6. Hence, we print 6 as the runner-up score. [[CO2](Analyze/HOCQ)]
- (b) Write a python program to check whether a string starts and ends with the same character or not (using Regular Expression)  
 Input : abba, Output : Valid  
 Input : a, Output : Valid  
 Input : abc, Output : Invalid. [[CO2] (Apply/IOCQ)]
- (c) For a=['hello', 'how', [1,2,3], [[10,20,30]]]  
 what is the output of following statement  
 (i) print( a[ : : ] )  
 (ii) print(a[-3][0])  
 (iii) print(a[2][ : -1])  
 (iv) print(a[0][ : : -1]) [[CO2](Understand/LOCQ)]  
**4 + 4 + 4 = 12**
5. (a) What is the main difference between a set and a frozenset? [[CO2] (Analyze/HOCQ)]
- (b) (i) Create an empty dictionary, with a name of your choice. Place a new element in the dictionary with key 'Name' & value 'Rohit Mondal' and with key 'Age' & value 20.  
 (ii) Write Python statement to display the number of elements in the dictionary.  
 (iii) What is returned when dic.get('age', 30) statement is executed?  
 (iv) What is returned when dic.values() statement is executed? [[CO2] (Understand/LOCQ)]
- (c) (i) What will be displayed when the following code is executed:  

```
import re
s = 'unputdownable'
pat = re.compile('u\w')
print(pat.split(s))
```

(ii) What will be displayed when the following code is executed:

```
import re
s = 'engineering'
mo = re.search('e\w\w\w', s)
print(mo.span())
```

(iii) What will be the content of t when the following code is executed:

```
s = 'a,b,c,d,e'
t = s.split(',',3)
```

[[CO2](Apply/IOCQ)]

$$2 + (1 + 1 + 1 + 1) + (2 + 2 + 2) = 12$$

### Group - D

6. (a) Using Pandas data structure, create a data frame from a dictionary of marks in English, Chemistry and Mathematics of four students, as given below:

Name	English	Chemistry	Mathematics
Preetam	90	90	92
Asha	80	92	99
Lata	89	80	89
Abhijit	88	92	90

[[CO3](Analyse/IOCQ)]

(b) Add another column showing the marks in Physics as 88, 82, 80, 79 respectively.

[[CO4](Remember/IOCQ)]

(c) Find the Total marks of each student and show it in a new column 'Total'.

[[CO2](Apply/IOCQ)]

(d) Display in tabular form, the descriptive statistics of all the four subjects and the total.

[[CO3, CO7](Understand/LOCQ)]

$$3 + 3 + 3 + 3 = 12$$

7. (a) Given a 2D array, arr, of shape (4, 4), write a NumPy expression to extract the sub-array consisting of the first two rows and last two columns.

[[CO3](Apply/IOCQ)]

(b) How can you sort a NumPy array, and what are the differences between numpy.sort and numpy.argsort?

[[CO3](Understand/LOCQ)]

(c) How can you extract specific date components (e.g., year, month) from a datetime column?

[[CO3](Apply/IOCQ)]

$$4 + 4 + 4 = 12$$

### Group - E

8. (a) Draw a line in a diagram from position (1, 3) to position (8, 10) using Matplotlib and label x and y axis?

[[CO5](Remember/LOCQ)]

(b) Write the syntax of button and label creation in Tkinter?

[[CO4](Remember/LOCQ)]

(c) Write a code in Tkinter to create image.

[[CO4](Apply/LOCQ)]

$$4 + 4 + 4 = 12$$

9. (a) Write a tkinter program to display two buttons named as "Bob" and "Alice" and print a message "Hello Bob" when "Bob" button is clicked and "Hello Alice" when "Alice" button is clicked.

[[CO4](Analyse/LOCQ)]

(b) Plot the following data using a line plot:

Day	1	2	3	4	5	6	7
Tickets Sold	2000	2800	3000	2500	2300	2500	1000

Before displaying the plot display "Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday" in place of Day 1, 2, 3, 4, 5, 6, 7

Change the color of the line to 'Magenta'.

[[CO5](Analyse/HOCQ)]

(c) Compare bar() and barh() functions.

[[CO5](Apply/IOCQ)]

$$4 + 6 + 2 = 12$$

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	44.8	42.71	12.5

