

- (c) What will be output for each print statements listed below (i) to (v) for the code snippet? (6)

```
import numpy as np
```

```
arr_2d =
```

```
np.array([[5,10,15], [20,25,30], [35,40,45]])
```

(i) `print(arr_2d)`

(ii) `print(arr_2d[1])`

(iii) `print(arr_2d[1][0])`

(iv) `print(arr_2d[2,:])`

(v) `print(arr_2d[:,:])`

[This question paper contains 12 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1357

I

Unique Paper Code : 2512011101

Name of the Paper : Programming Fundamentals
using Python

Name of the Course : **B.Sc. (H) Electronics (Core)**

Semester : I

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt 5 questions in all.
3. Question No. 1 is compulsory.
4. All questions carry equal marks.

1. (a) Evaluate the following expression: (3)

`5 % 10 + 10 - 25 * 8 // 5`

- (b) What will be the output produced on the execution of the following code snippet? (3)

`for index in range(30,12,-5) :`

`print(index, end = ' ')`

- (c) In the given code snippet, state the value of M after execution of each statement: (3)

`M = [10,20,30,20]`

`M.append(80)`

`print(M)`

`M.remove(20)`

`print(M)`

`M.extend(['fragrance'])`

`print(M)`

- (d) Differentiate between Encapsulation and Abstraction with suitable examples. (3)

7. (a) The monthly sale and income values of a shop are as below : (6)

Month	1	2	3	4	5	6
Sale	100	200	300	300	250	400
Income	10	15	30	20	20	45

Write a program to show Monthly Sale and Income as subplots.

- (b) Consider the following recursive function : (6)

`def recurFunc(n):`

`if n==0:`

`return 1`

`else:`

`return n * recurFunc(n-1)`

Determine and explain the output produced on execution of the following statements :

`result = recurFunc(3)`

`print(result)`

```
import pandas as pd

data = {"Revenue": [55000, 62000, 58000]}

df = pd.DataFrame(data, index=["January", "February",
                                "March"])
```

Perform the following tasks:

- (i) Calculate the total revenue for the first quarter.
 - (ii) Identify the month with the highest revenue.
 - (iii) Create a new column called "Revenue Category" where revenue greater than 60,000 is labeled as "High" and the rest as "Low."
- (c) Write a program that takes the number of lines n as an input from the user and prints the following pattern (say, for $n = 6$): (6)

```
* * * * *
*           *
*           *
*           *
*           *
*           *
* * * * *
```

- (e) Consider the popularity of different programming languages stored in form of list as shown below: (3)

```
languages = ["Python", "JavaScript", "Java", "C#",
              "C++", "Ruby"]

popularity = [29.9, 19.1, 15.2, 10.3, 8.7, 5.1]
```

Give appropriate title to the graph and add ticks separated by a distance of 4 units and yticks separated by a distance of 3 units.

- (f) Differentiate between the keywords break and continue in Python with suitable examples. (3)

2. (a) Write a program that reads a number and check whether it is positive, negative or zero. (6)
- (b) What will be the output produced on the execution of the following code snippet? (6)

```
num = 10
while num > 0:
    print(num)
    num -= 2
    if num == 3:
        break
else:
    print("Done")
```

(c) Identify the output/error (if any) for the following.

Justify your answer if it is an error. (6)

(i) `set_of_code={'Alpha', 'Beta', 'Gamma'}`
`print(set_of_code[2])`

(ii) `tupl=(8)`
`print(tupl.index(8))`

(iii) `list1 = [10, 7, 3, 'Add', 20]`
`print(sum(list1))`

(iv) `str1='Hi, where are you?'`
`str1[4]='w'`

(v) `Ascii= {'A':65, 'B':66, 'A':67}`
`Ascii.pop('A')`
`print(Ascii)`

3. (a) Consider the following nested list : (6)

`studMarks = [['Sandhya', 90], ['Sita', 76],
 ['Shyam', 56]]`

Write a program to determine the number of students who have obtained distinction (≥ 75).

6. (a) Differentiate between class variable and instance variable. (6)

Write a complete program that defines a class Bank that keeps track of the bank customers. The class should contain the following data members:

accountNum – Account number of the customer

name – Name of the customer

balance – Amount deposited in account.

The class should contain the following methods :

(i) `__init__` for initializing the data members.

(ii) `deposit()` to deposit money in the bank account.

(iii) `__str__()` that returns string representation for displaying the data members in a suitable manner.

(b) Consider the following Pandas DataFrame that represents the monthly revenue of a company for the first quarter of the year : (6)

- (b) What will be the output produced on the execution of the following code snippet? (6)

```
color = set(['White', 'Green', 'Yellow', 'Blue'])
```

```
primary = set(['Red', 'Green'])
```

```
print('Green' in color)
```

```
allcolor=color.union(primary)
```

```
print(allcolor)
```

```
print(color.intersection(primary))
```

```
print(color.difference(primary))
```

- (c) Consider the following string : (6)

```
Pname = "Programming Fundamentals Using Python"
```

What will be the output produced on executing the following statements?

(i) Pname.count('P')

(ii) Pname.swapcase()

(iii) Pname.rfind('h')

(iv) Pname.split(' ')

- (b) Consider the following string : (6)

```
greeting = 'Good Morning. Have a Good Day!!'
```

What will be the output produced on executing each of the statements/function calls?

(i) greeting[-len(greeting): len(greeting)]

(ii) greeting[:-12] + greeting[-12:]

(iii) greeting.isalpha()

(iv) greeting.istitle()

(v) greeting.replace('Good', 'Sweet')

(vi) greeting.endswith('!!!')

- (c) Consider the following function : (6)

```
def myFun(a, b = 1):
```

```
    return a + b
```

What will be the output produced when the following calls are made?

(i) myFun(b = 7)

(ii) myFun(2)

4. (a) Define a function `areaTriangle()` that takes the lengths of three sides: `side1`, `side2`, and `side3` of the triangle as the input parameters and returns the area of the triangle as the output. Also, define a function `main()` that accepts inputs from the user interactively and computes the area of the triangle using the function `areaTriangle()`. Also, assert that sum of the length of any two sides is greater than the third side. (6)

- (b) If $a=10$, $b=12$, $c=0$. find the values of following expressions : (6)

(i) $a!=6$ and $b>5$

(ii) $a==9$ or $b < 3$

(iii) $\text{not } (a < 10)$

(iv) $\text{not}(a > 5 \text{ and } c)$

(v) $5 \text{ and } c!=8 \text{ or not } c$

(vi) $a**b*c$

- (c) What will be the output produced on the execution of the following code snippet? (6)

```
a = 1
def f():
    print('Value of 'a' Inside f() : ', a)
def g():
    a = 2
    print('Value of 'a' Inside g() : ', a)
def h():
    global a
    a = 3
    print('Value of 'a' Inside h() : ', a)
print('global : ', a)
f()
print('Value of 'a' after f() : ', a)
g()
print('Value of 'a' after g() : ', a)
h()
print('Value of 'a' after h() : ', a)
```

5. (a) Write a program to check whether a given number is prime or not. (6)