



## School of Engineering

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Name:.....

Roll No:.....Branch:.....

Year:.....Sem:.....



# INDEX

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## PROGRAM OUTCOMES

A B.Tech –graduate should possess the following program outcomes.

- 1 **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- 2 **Problem analysis:** Identify ,formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3 **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4 **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5 **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6 **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7 **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9 **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams ,and in multi disciplinary settings.
- 10 **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large ,such as, being able to comprehend and write effective reports and design documentation ,make effective presentations ,and give and receive clear instructions.
- 11 **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
- 12 **Lifelong learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## (22AIE205) PROBLEM SOLVING USING PYTHON PROGRAMMING LAB

### **PROGRAM OBJECTIVES:**

1. Able to understand Syntax and Semantics and create Arrays and Functions in Python.
2. Able to learn different data types Lists, Dictionaries in Python.
3. Able to know how to execute the programs using loops and control statements.
4. Able to learn decision Making and Functions in Python.
5. Able to know how to handle Files and exceptions in Python.

### **Week 1:**

- A) Write python program to print Hello World
- B) Write a python program to get string, int, float input from user
- C) Write a python program to add 2 numbers

### **Week 2:**

- A) Create a list and perform the following methods  
1) insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()
- B) Write a python program to find the length of list?
- C) Write a python program to find the smallest and largest number in the list?

### **Week 3:**

- A) Create a tuple and perform the following methods  
1) Add items 2) len() 3) check for item in tuple 4) Access items
- B) Write a python program using the following methods: 1) count 2) index
- C) Write a python program using "+" and "\*" operations which resulting a new tuple?

### **Week 4:**

- A) Create a dictionary and apply the following methods  
1) Print the dictionary items 2) access items 3) use get() 4) change values 5) use len()
- B) Write a python code to convert list of tuples into dictionaries?
- C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

### **Week 5:**

- A) Write a python program to perform arithmetic, assignment, logical and comparison operators?
- B) Write a Python program to add two positive integers without using the '+' operator.  
(use bitwise operator)
- C) Write a Python program to perform the basic four operators (+, -, \*, /)

### **Week 6:**

- A) Write a simple python program to declare a variable in different possible ways?
- B) Write a python program to show precedence of operators using the expression:  $z = (v+w) * x / y$
- C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation?

**Week 7:**

- A) Write a python program to print a number is positive/negative using if-else.
- B) Write a python program to find largest number among three numbers.
- C) Write a python Program to read a number and display corresponding day using if\_elif\_else?
- D) Write a python program to print list of numbers using range and for loop

**Week 8:**

- A) Write a python code to print the sum of natural numbers using while loop?
- B) Write a python program to print the factorial of given number?
- C) Write a python program to find the sum of all numbers stored in a list using for loop?

**Week 9:**

- A) Using a numpy module create an array and check the following:
  - 1. Type of array 2. Axes of array 3. Shape of array 4. Type of elements in array
- B) Using a numpy module create array and check the following:
  - 1. List with type float 2. 3\*4 array with all zeros 3. From tuple 4. Random values

**Week 10:**

- A) Write python program in which a function is defined and calling that function prints HelloWorld.
- B) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.
- C) Write a python program using with any one of python function argument.

**Week 11:**

- A) Write a program to double a given number and add two numbers using lambda().
- B) Write a program for filter() to filter only even numbers from a given list.
- C) Write a program for map() function to double all the items in the list?
- D) Write a program to find sum of the numbers for the elements of the list by using reduce().

**Week 12:**

- A) Write a python program to open and write "hello world" into a file.
- B) Write a python program to write the content "hi python programming" for the existing file.
- C) Write a python program to read the content of a file.

**Week 13:**

- A) Write a python program to append data to an existing file and then displaying the entire file.
- B) Write a python program to open a new file, add some data into it and display the contents of that file.

**Week 14:**

- A) Write a python program to handle the ZeroDivisionError exception.
- B) Write a python program to demonstrate multiple except block with a single try block.

**TEXT BOOKS:**

1. R. Nageswara Rao, "Core Python Programming", dream tech
2. Allen B. Downey , " Think Python: How to Think Like a Computer Scientist", SecondEdition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

**PROGRAM OUTCOMES:**

After completion of the course, Students will be able to:

1. Evaluate Problem solving and programming capability.
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
3. Implement conditional and loop for python programs.
4. Express different Decision Making statements, Arrays and Functions.
5. Understand and summarize different File handling operations and exceptions.

## **CONTENTS**

<b>Week - No</b>	<b>S.No/ Program No</b>	<b>List of Programs</b>
1	1	A) Write python program to print Hello World
	2	B) Write a python program to get string, int, float input from user
	3	C) Write a python program to add 2 numbers
2	1	A) Create a list and perform the following methods 1) insert() 2) remove() 3) append() 4) pop() 5) clear()
	2	B) Write a python program to find the length of list?
	3	C) Write a python program to find the smallest and largest number in the list?
3	1	A) Create a tuple and perform the following methods 1) Access items 2) len() 3) check for item in tuple 4) Add item
	2	B) Write a python program using the following methods: 1) count 2) index
	3	C) Write a python program using “+” and “*” operations which resulting a new tuple?
4	1	A) Create a dictionary and apply the following methods, 1) Print the dictionary items 2) access items 3) use get() 4) change values 5) use len()
	2	B) Write a python code to convert list of tuples into dictionaries?
	3	C) Write python program to store data in list, tuple, set, dictionary and then try to print them.
5	1	A) Write a python program to perform arithmetic, assignment, logical and comparison operators?
	2	B) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)
	3	C) Write a Python program to perform the basic four operators (+, -, *, /)
6	1	A) Write a simple python program to declare a variable in different possible ways?
	2	B) Write a python program to show precedence of operators using the expression: $z = (v+w) * x / y$
	3	C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation?.
7	1	A) Write a Python program to print a number is positive/negative using if-else
	2	B) Write a Python program to find largest number among three numbers
	3	C) Write a python Program to read a number and display corresponding day using if _elif _else?
	4	D) Write a python program to print list of numbers using range and for loop

8	1	A) Write a python code to print the sum of natural numbers using while loop?
	2	B) Write a python program to print the factorial of given number?
	3	C) Write a python program to find the sum of all numbers stored in alist using for loop?
9	1	A) Using a numpy module create an array and check the following: 1. Type of array      2. Axes of array 3. Shape of array    4. Type of elements in array
	2	B) Using a numpy module create array and check the following: 1. List with type float   2. 3*4 array with all zeros 3. From tuple              4. Random values
10	1	A) Write python program in which an function is defined and calling that function prints Hello World
	2	B) Write python program in which an function (with single string parameter) is defined and calling that function prints the string parameters given to function.
	3	C) Write a python program using with any one of python function argument?
11	1	A) Write a program to double a given number and add two numbers using lambda()?
	2	B) Write a program for filter() to filter only even numbers from a given list.
	3	C) Write a program for map() function to double all the items in the list?
	4	D) Write a program to find sum of the numbers for the elements of the list by using reduce()?
12	1	A) Write a python program to open and write "hello world" into a file?
	2	B) Write a python code to demonstrate exception handling?
	3	C) Write a python program to write the content "hi python programming" for the existing file.
	4	D) Write a python program to concatenate two files into third file?
13	1	A) Write a python program to append data to an existing file and then displaying the entire file.
	2	B) Write a python program to open a new file, add some data into it and display the contents of that file.
14	1	A) Write a python program to handle the ZeroDivisonError exception.
	2	B) Write a python program to demonstrate multiple except block with a single try block.



## **INSTRUCTIONS TO** **STUDENTS**

1. Students should bring lab Manual/Record for every laboratory session and should enter the readings /observations in the manual while performing the experiment.
2. The group- wise division made in the beginning should be adhered to, and no mix up of students among different groups will be permitted later.
3. The components required pertaining to the experiment should be collected from stores in –charge after duly filling in the requisition form.
4. When the experiment is completed, students should disconnect the setup made by them, and should return all the components/instruments taken for the purpose.
5. Any damage to the apparatus that occurs during the experiment should be brought to the notice of lab in-charge, consequently, the cost of repair or new apparatus should be brought by the students.
6. After completion of the experiment, certification of the concerned staff in –charge in the observation book is necessary.
7. Students should be present in the labs for the total scheduled duration.
8. Students should not carry any food items inside the laboratory.
9. Use of cell phones and IPODs is forbidden.
10. Students should not write on or deface any lab desks, computers, or any equipment provided to them during the experiment.
11. Every student should keep his/her work area properly before leaving the laboratory.

## **PROGRAM-1**

**Date:**

**Aim:**

A) Write python program to print Hello World

**Program:**

```
print("Hello World")
```

**Output:**

Hello World

**Exercise Questions:**

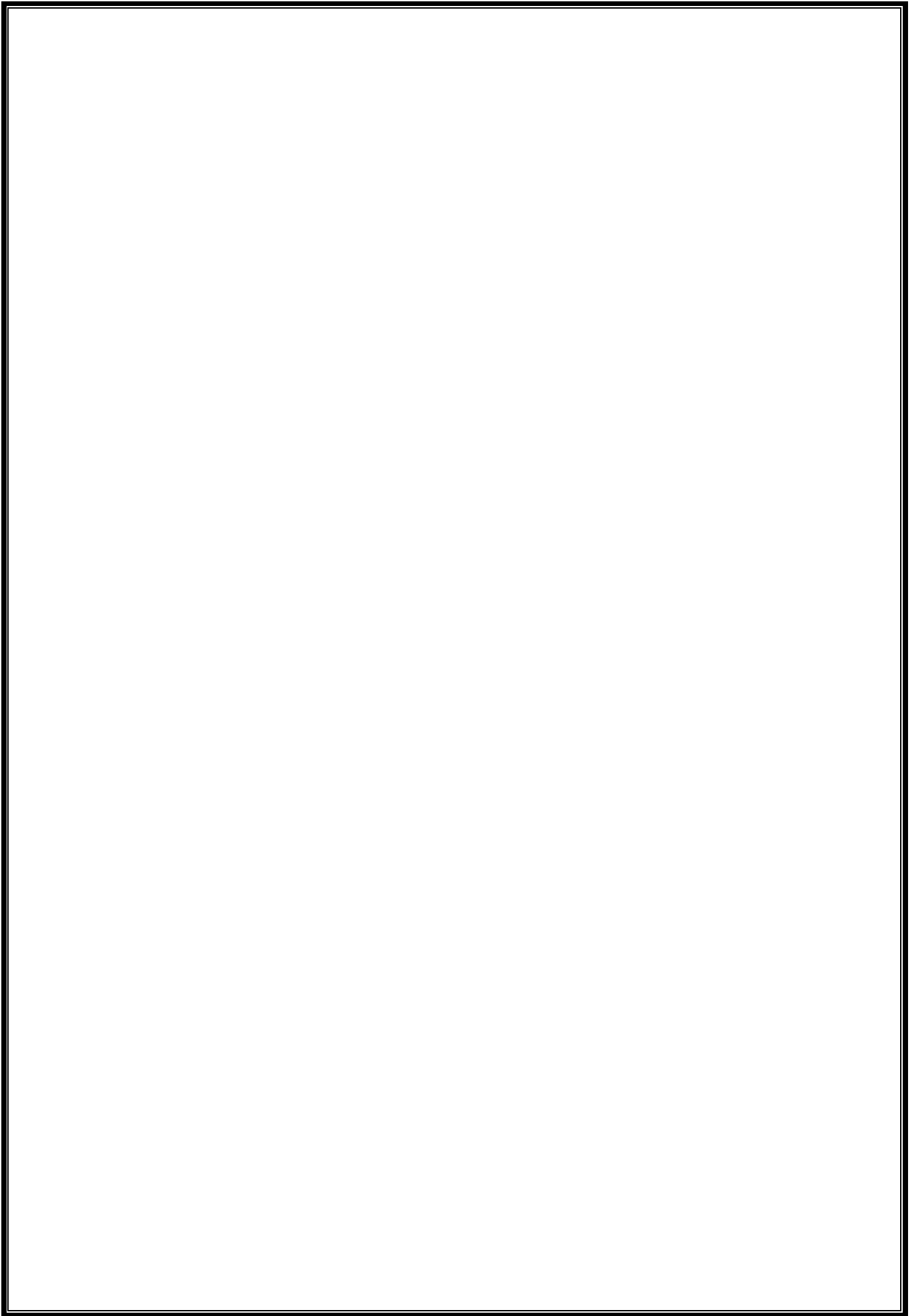
- A) Write a python program to get string, int, float input from user
- B) Write a python program to add 2 numbers

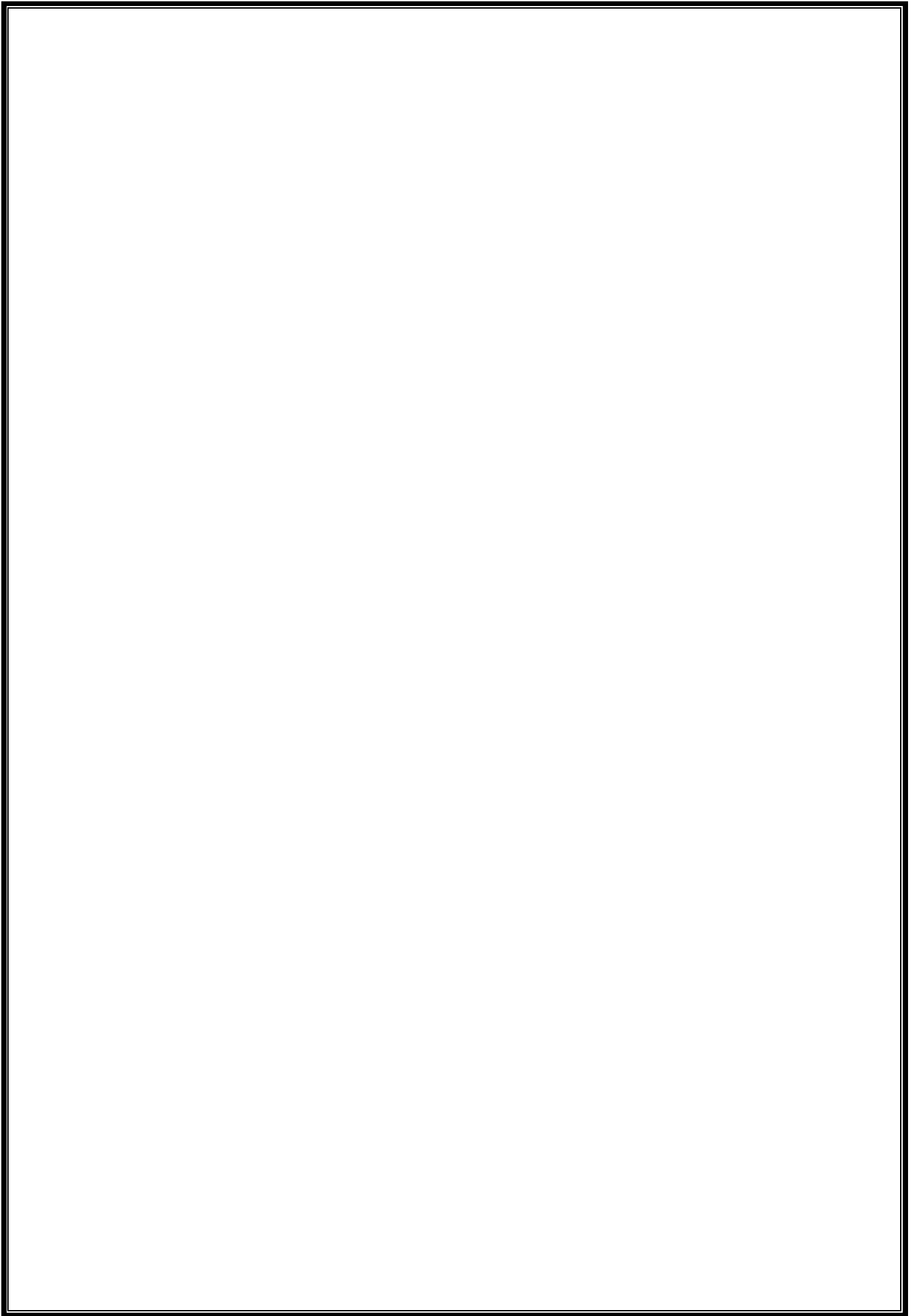
**Viva Questions:**

1. Define python?
2. Write the steps to install and set path to python?
3. List out differences between interactive mode and script mode?

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**Record Notes**





## **PROGRAM-2**

**Date:**

### **Aim:**

A) Create a list and perform the following methods

1) insert() 2) remove() 3) append() 4) pop() 5) clear()

### **Program:**

```
a=[1,3,5.7,"hello","food"]
print(a)
a.insert(4,"mrcet")
print(a)
a.remove("food")
print(a)
a.append("cse")
print(a)
print(a.pop())
print(a.clear())
```

### **Output:**

```
[1, 3, 5.7, 'hello', 'food']
[1, 3, 5.7, 'hello', 'mrcet', 'food']
[1, 3, 5.7, 'hello', 'mrcet']
[1, 3, 5.7, 'hello', 'mrcet', 'cse']
cse
None
```

### **Exercise Questions:**

B) Write a python program to find the length of list?

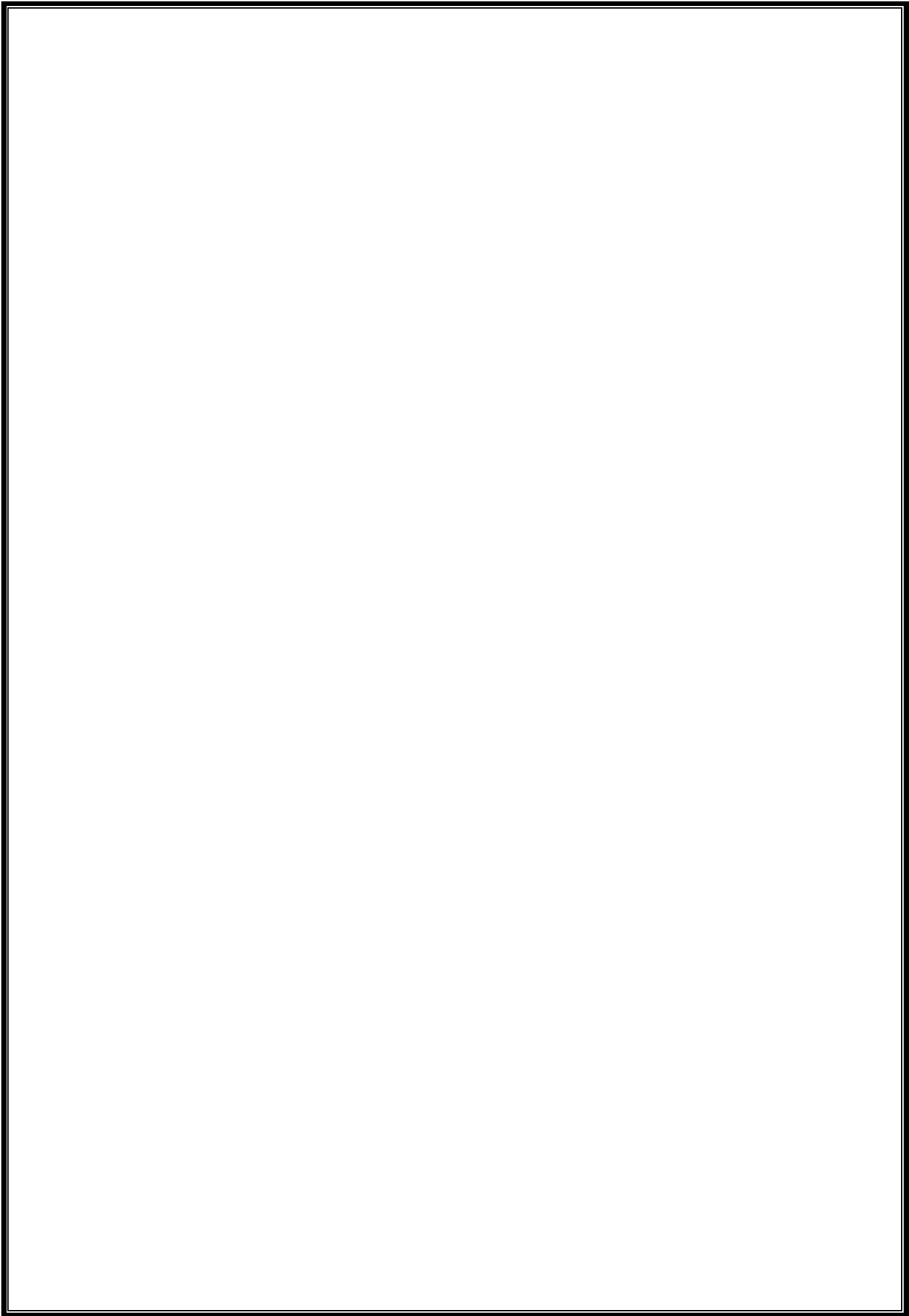
C) Write a python program to find the smallest and largest number in the list?

### **Viva Questions:**

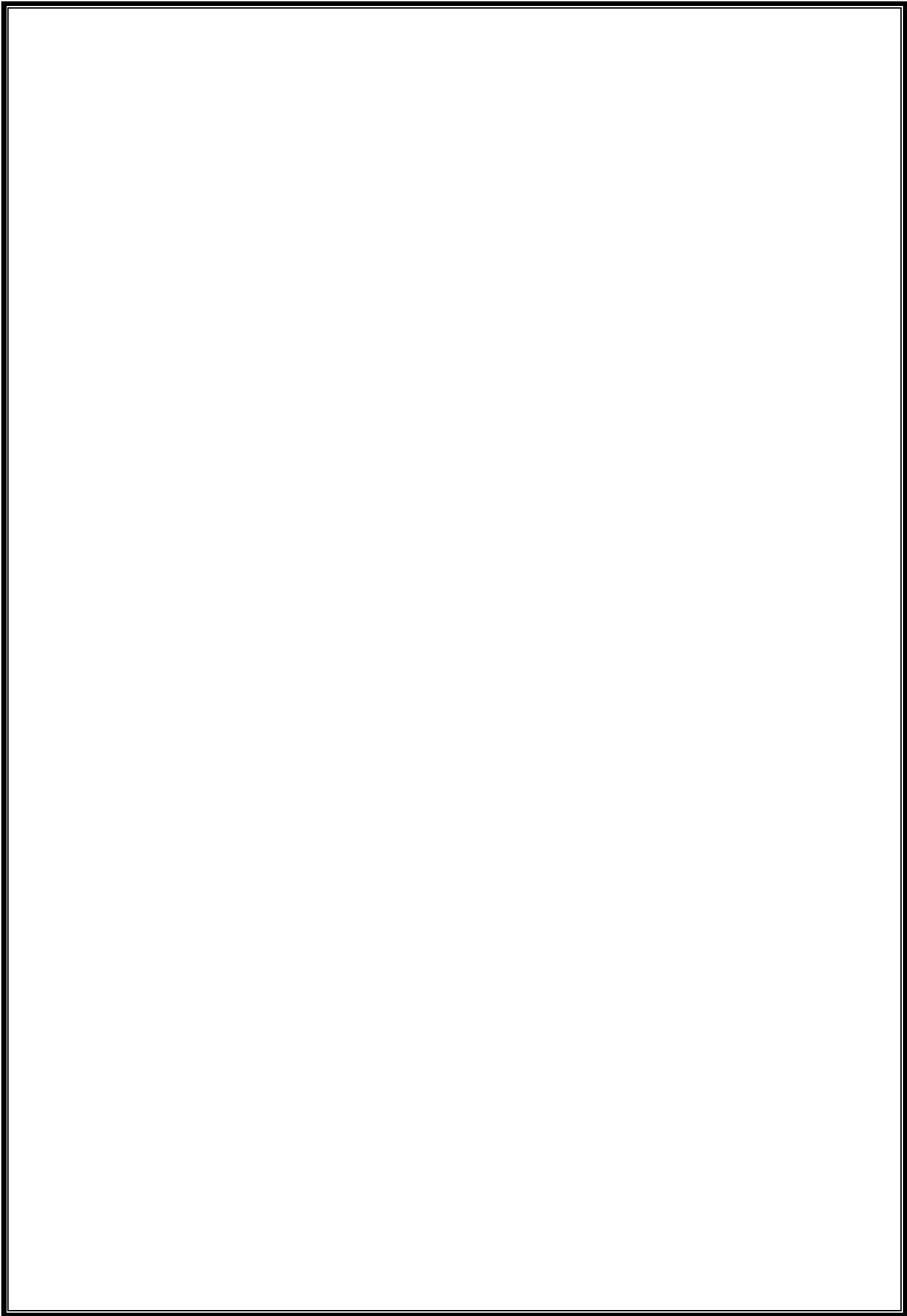
1. Define and create a list?
2. Justify the list is mutable with example?
3. List out different methods of list with one example each?

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### PROGRAM-3

Date:

**Aim:**

- A) Create a tuple and perform the following methods  
1) Access items 2) len() 3) check for item in tuple 4) Add item

**Program:**

```
tup=(1,2,3,4,5,'a','bb','c','xyz')
print("Items in a tuple")
for i in tup:
    print(i,end=" ")
print("\nLength of tuple",len(tup))
i=int(input("enter a value"))
print(i in tup)
tup[1]="hello"
print(tup)
```

**Output:**

```
Items in a tuple
1 2 3 4 5 a bb c xyz
Length of tuple 9
enter a value4
True
Traceback (most recent call last):
File "C:/Users/hi/tup1.py", line 8, in <module>
tup[1]="hello"
TypeError: 'tuple' object does not support item assignment
```

**Exercise Questions:**

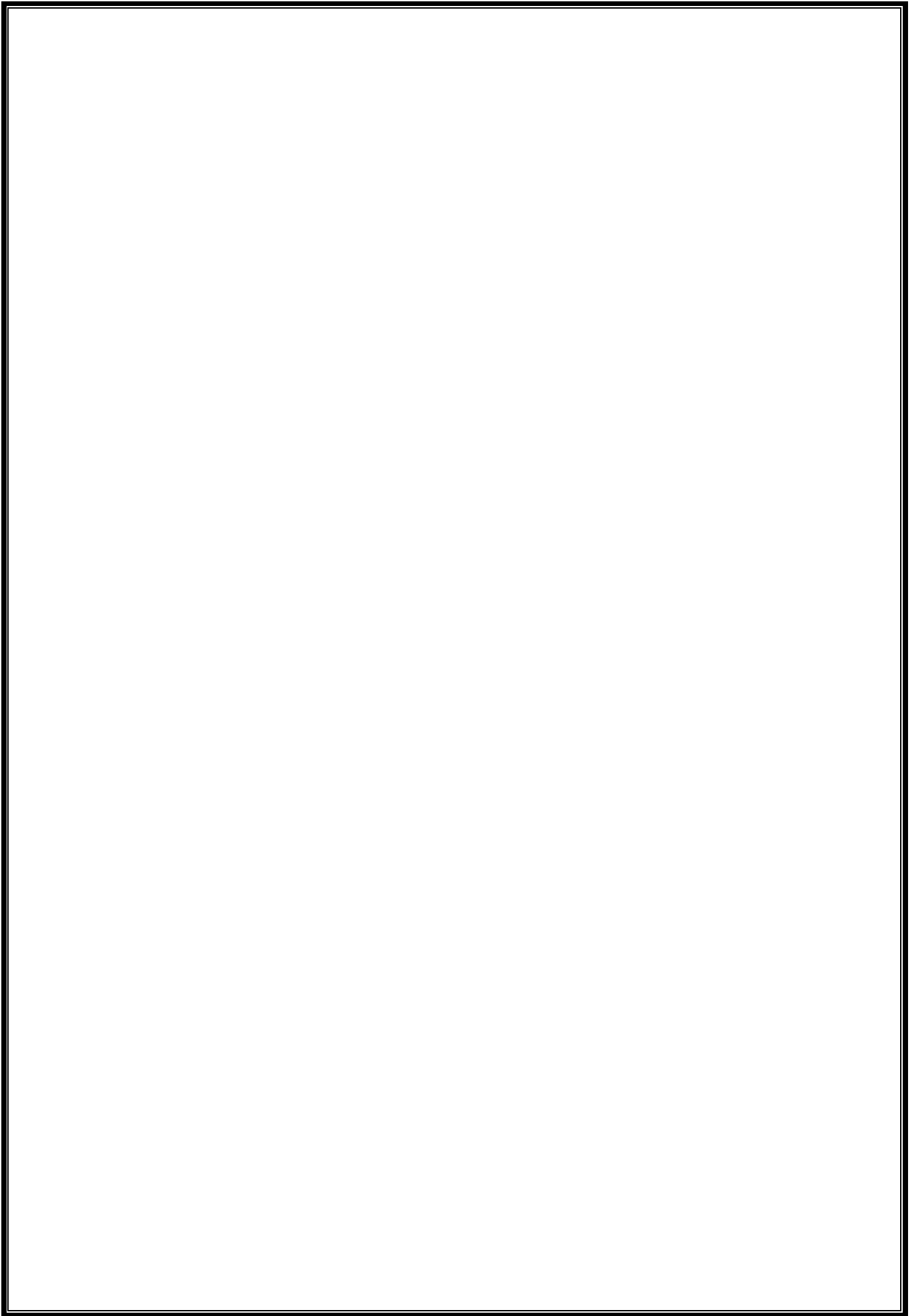
- B) Write a python program using the following methods: 1) count 2) index  
C) Write a python program using “+” and “\*” operations which resulting a new tuple?

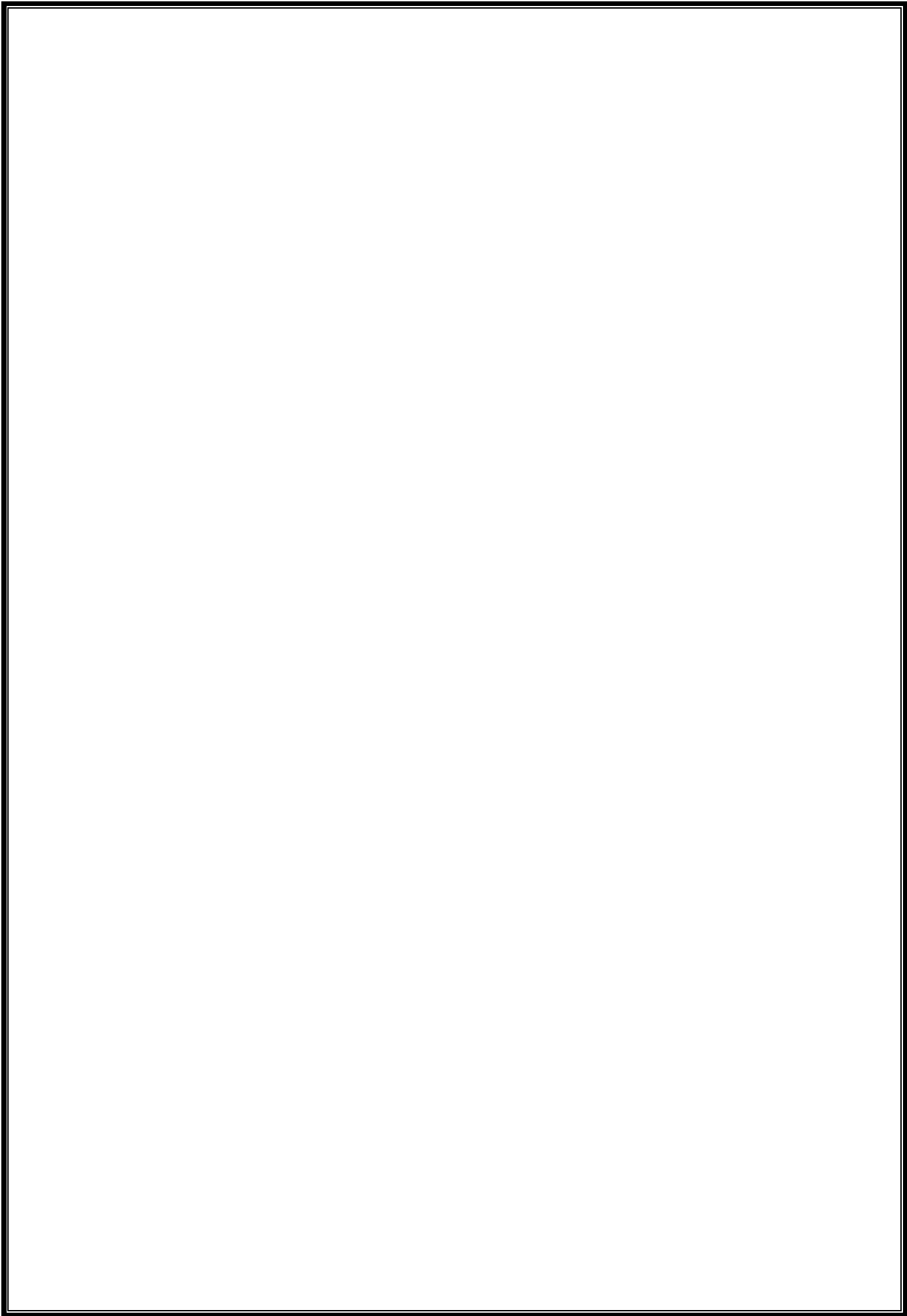
**Viva Questions:**

1. Define tuple?
2. Define indexing and slicing?
3. Demonstrate python casting with one example?
4. Difference between tuple and list?

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## PROGRAM-4

**Date:**

### **Aim:**

- A) Create a dictionary and apply the following methods  
1) Print the dictionary items 2) access items 3) use get()  
4) change values 5) use len()

### **Program:**

```
dict={'Name': 'mrcet', 'Age': 20}
print(dict.items())
print(dict)
print(dict.get("Age"))
dict[3]="college"
print(dict)
print(len(dict))
```

### **Output:**

```
dict_items([('Name', 'mrcet'), ('Age', 20)])
{'Name': 'mrcet', 'Age': 20}
20
{'Name': 'mrcet', 'Age': 20, 3: 'college'}
3
```

### **Exercise Questions:**

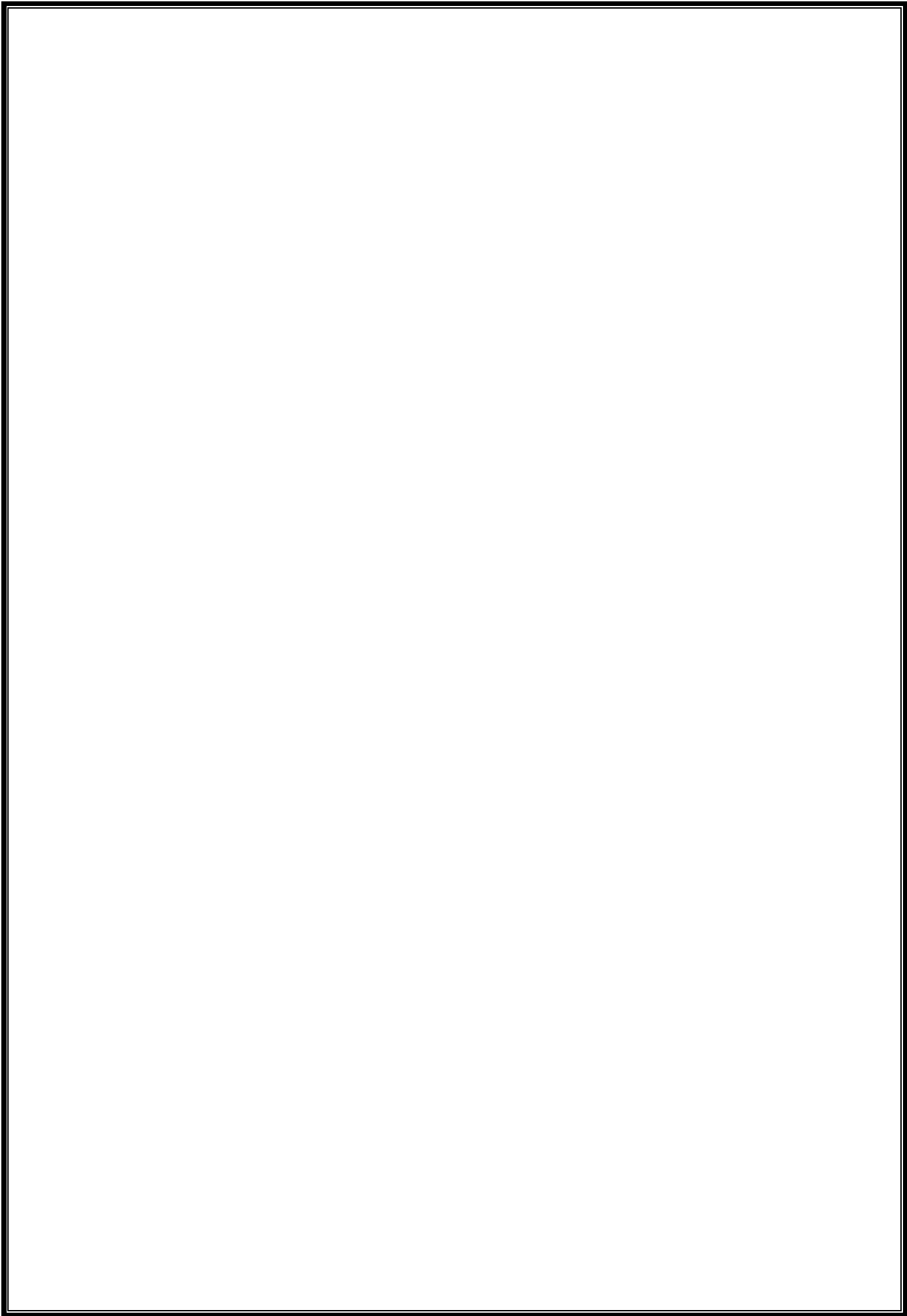
- B) Write a python code to convert list of tuples into dictionaries?  
C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

### **Viva Questions:**

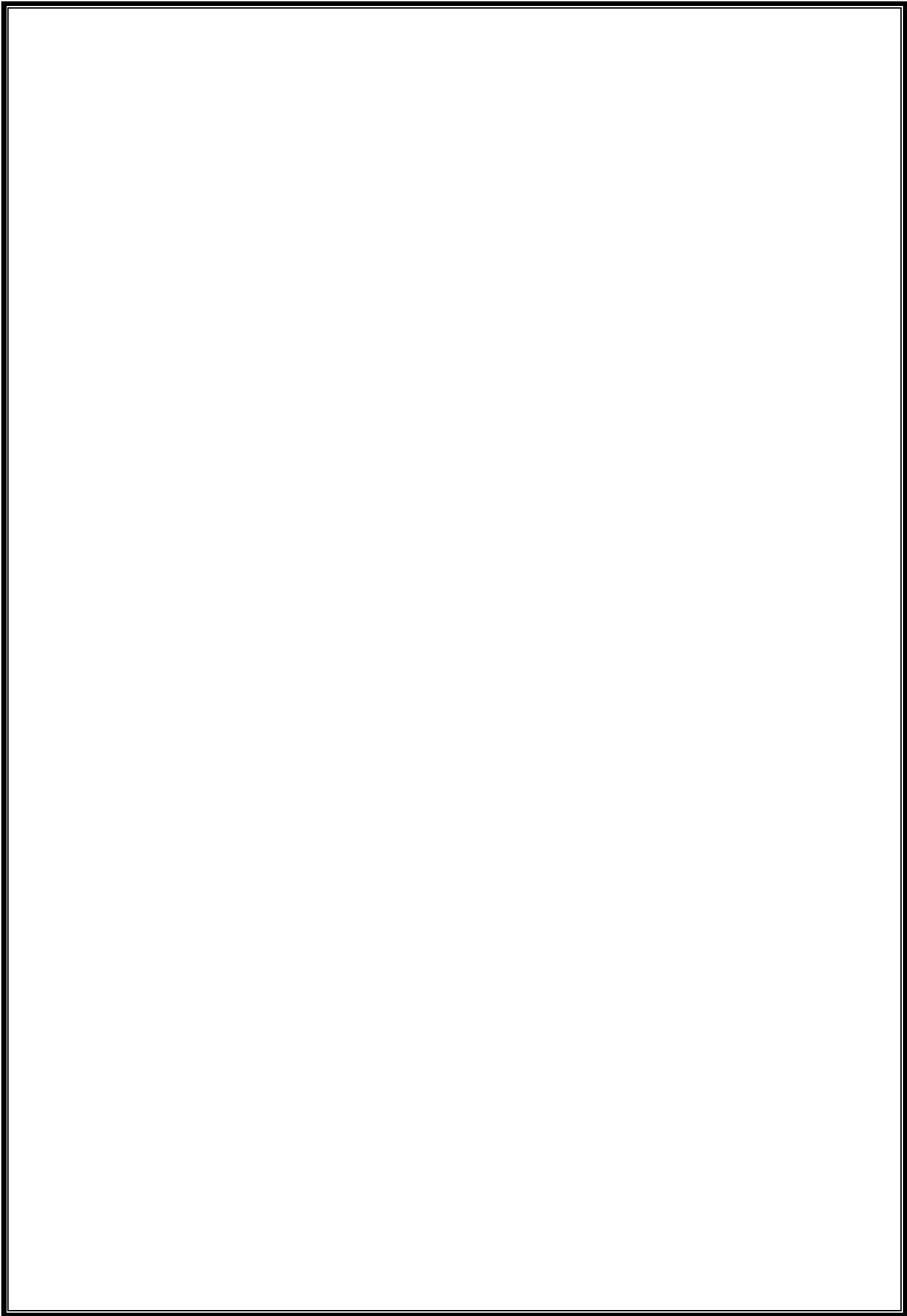
1. Define dictionary?
2. Differentiate between list, tuple, set, dictionary
3. Write the syntax to access keys, values and item of a dictionary?

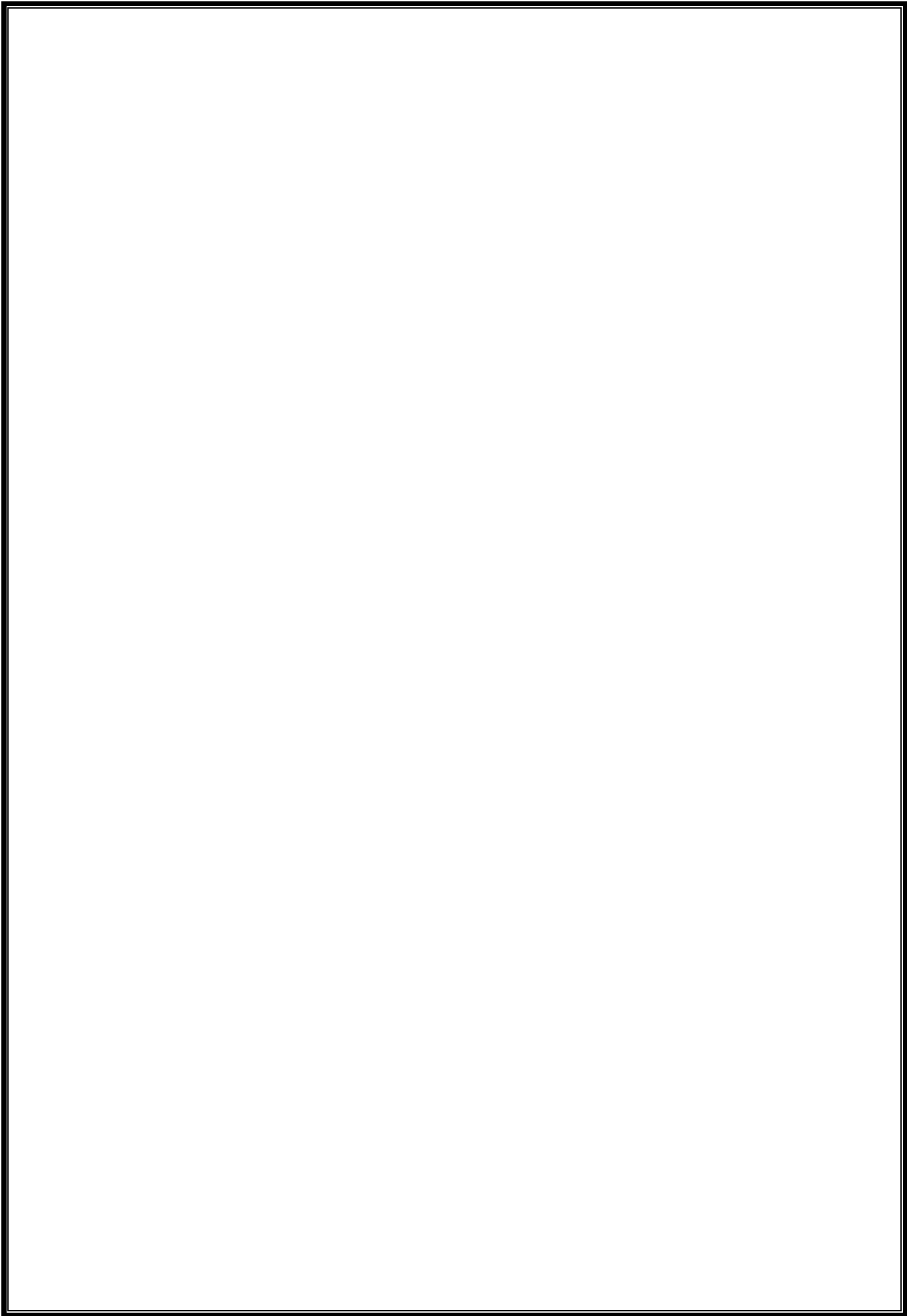
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## PROGRAM-5

**Date:**

### **Aim:**

A) Write a python program to perform arithmetic, assignment, logical and comparison operators?

### **Program:**

```
a=int(input("enter a value"))
b= int(input("enter bvalue"))
print(a+b)
print(a is not b)
print(a and b)
print(a==b)
```

### **Output:**

```
enter a value10
enter b value20
30
True
20
False
```

### **Exercise Questions:**

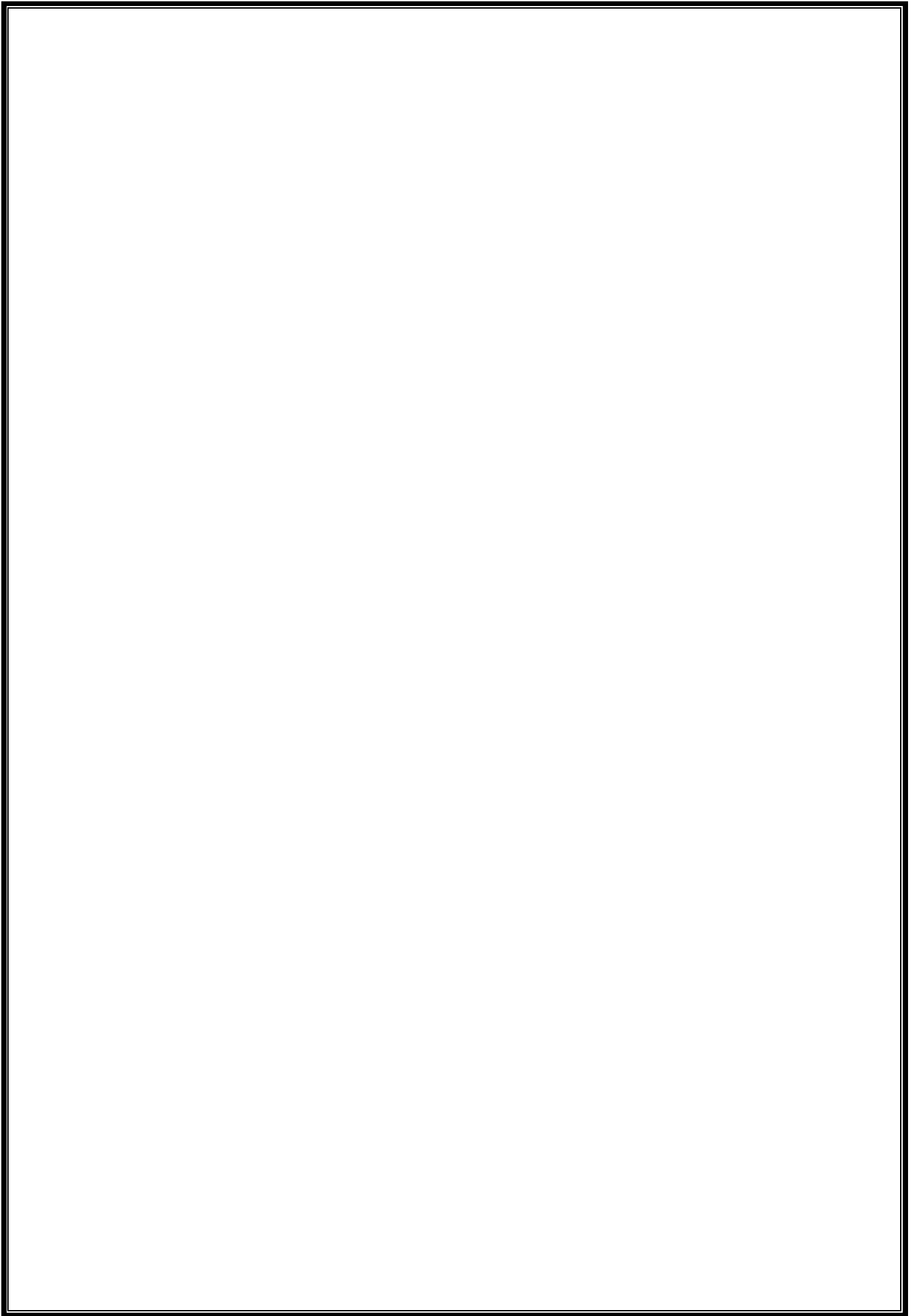
- A) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)
- B) Write a Python program to perform the basic four operators (+, -, \*, /)

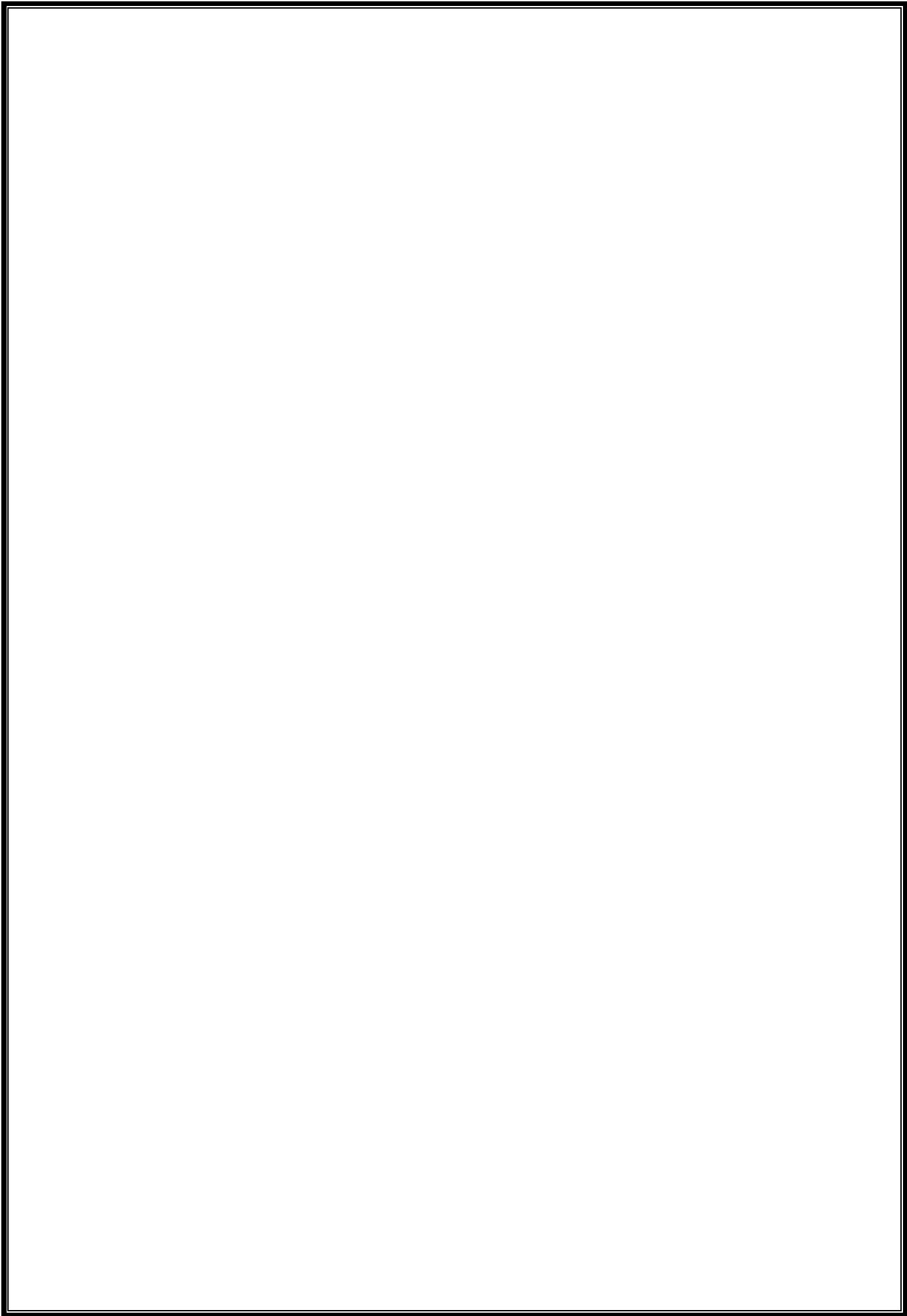
### **Viva Questions:**

1. Define precedence of operators with an example?
2. List out different types python basic operators with on example each?
3. Explain bitwise, membership and identity operators?

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## PROGRAM-6

**Date:**

### **Aim:**

A) Write a simple python program to declare a variable in different possible ways?

### **Program:**

```
a=10
print(a)
a=b=c=1
print(a)
print(b)
print(c)
a,b,c=1,"hello",5.6
print(a,b,c)
a=20
print(a)
```

### **Output:**

```
10
1
1
1
1 hello 5.6
20
```

### **Exercise Questions:**

- A) Write a python program to show precedence of operators using the expression:  $z = (v+w) * x / y$
- B) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation?

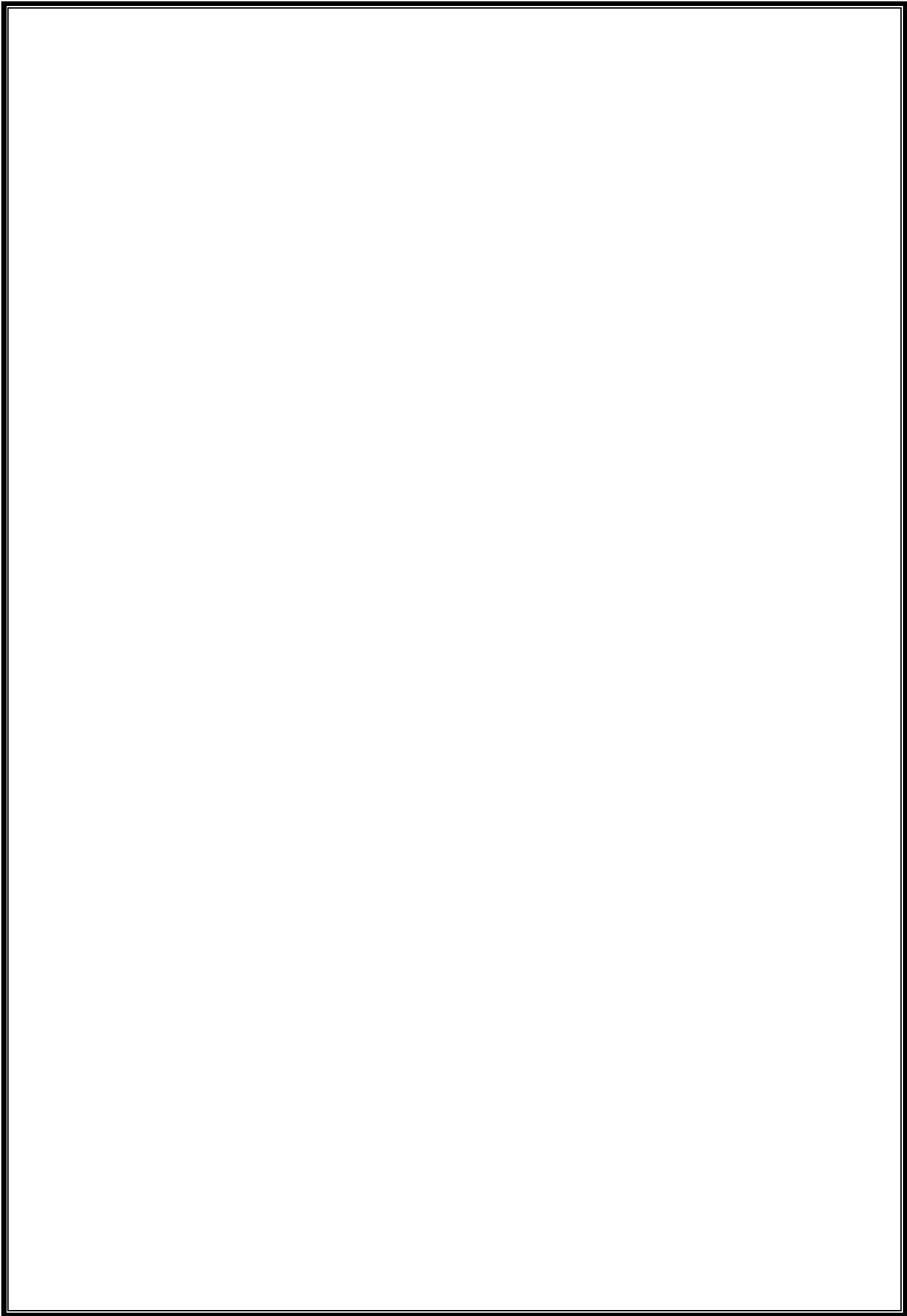
### **Viva Questions:**

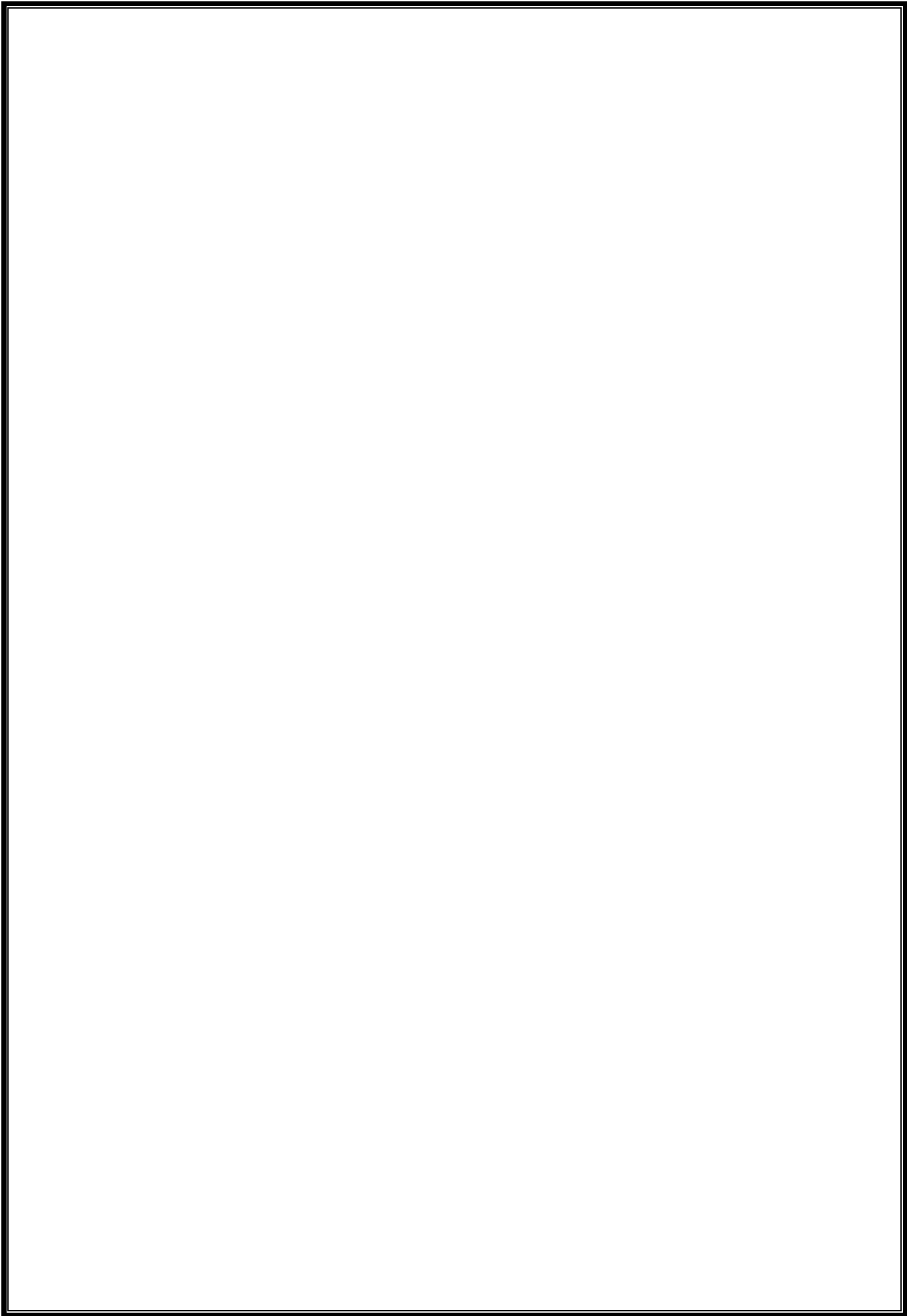
- 1. List out the rules of variables?
- 2. Explain output variables?
- 3. Define python expression with an example?

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## **PROGRAM-7**

**Date:**

### **Aim:**

A) Write a python program to print a number is positive/negative using if-else.

### **Program:**

```
a=int(input("enter a number"))
if a>0:
    print(a,"is positive")
else:
    print(a,"is negative")
```

### **Output:**

enter a number -1

-1 is negative

### **Exercise Questions:**

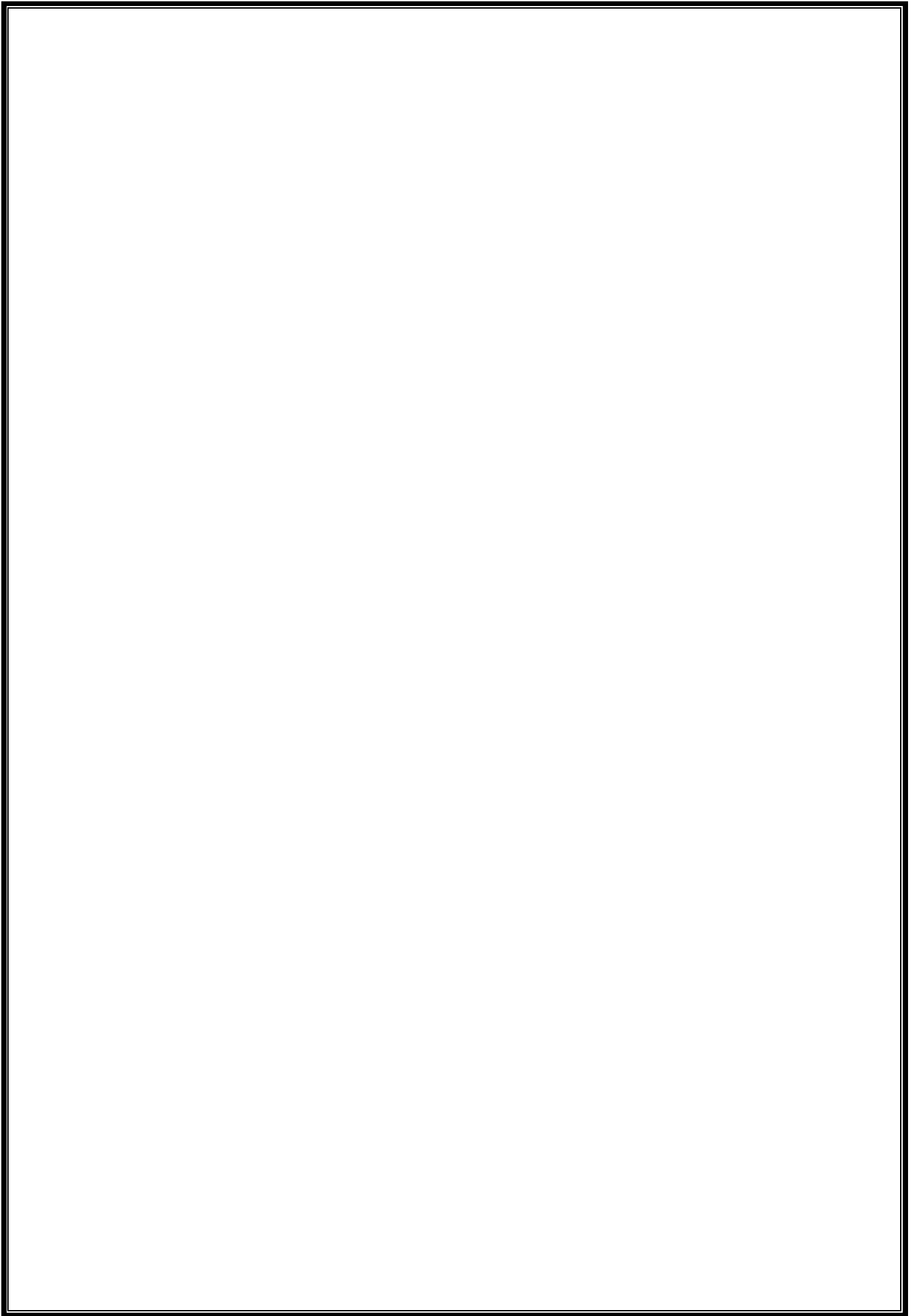
- B) Write a python program to find largest number among three numbers.
- C) Write a python Program to read a number and display corresponding day using if\_elif\_else?
- D) Write a python program to print list of numbers using range and for loop

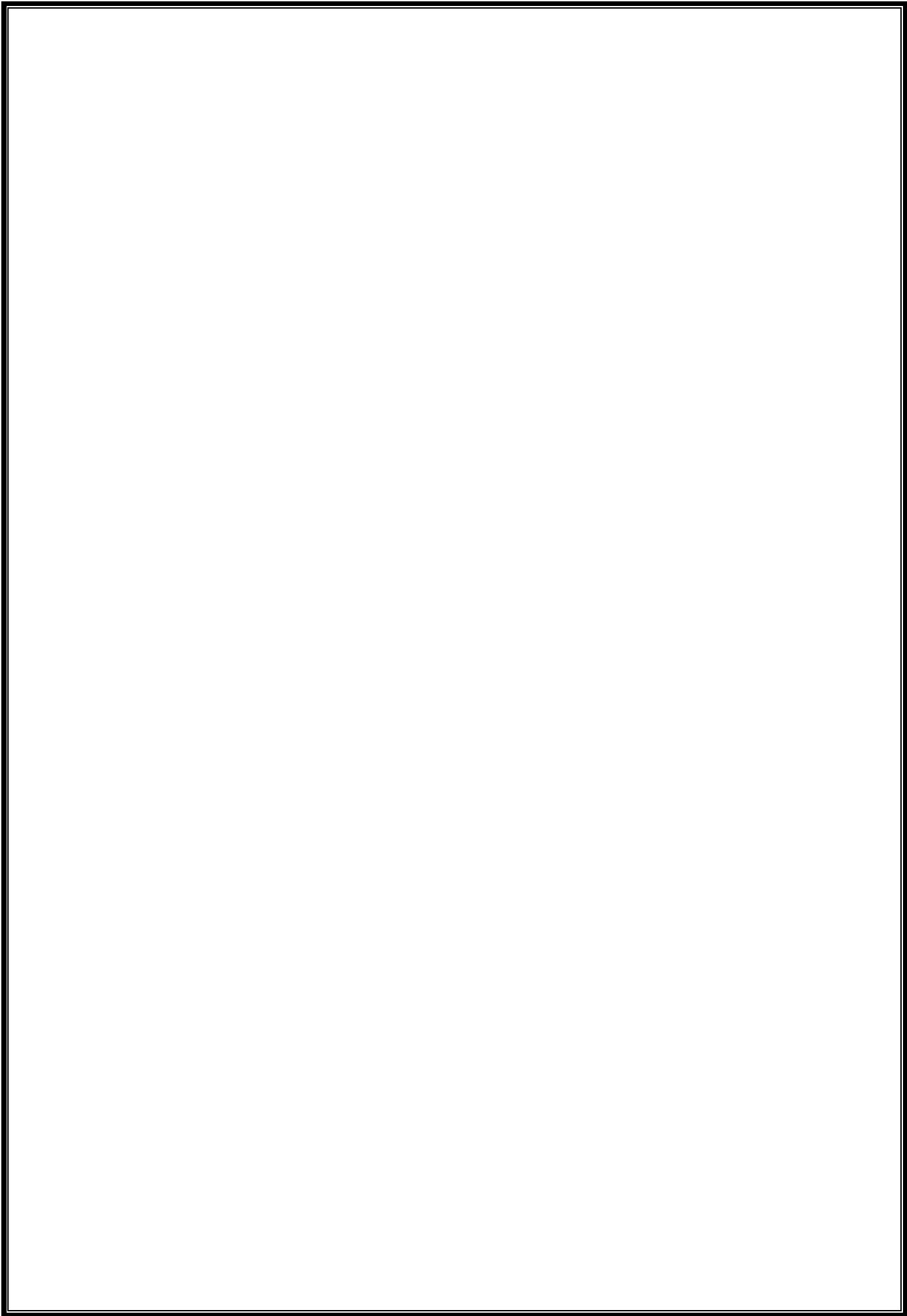
### **Viva Questions:**

1. List out various control flows?
2. Write the syntax of for and while loops?
3. Difference between for and while loops?

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## PROGRAM-8

**Date:**

**Aim:**

A) Write a python code to print the sum of natural numbers using while loop?

**Program:**

```
num = int(input("Enter a number: "))
if num < 0:
    print("Enter a positive number")
else:
    sum = 0
    # use while loop to iterate until zero
    while(num > 0):
        sum += num
        num -= 1
    print("The sum is",sum)
```

**Output:**

Enter a number: 6  
The sum is 21

**Exercise Questions:**

- A) Write a python program to print the factorial of given number?
- B) Write a python program to find the sum of all numbers stored in a list using for loop?

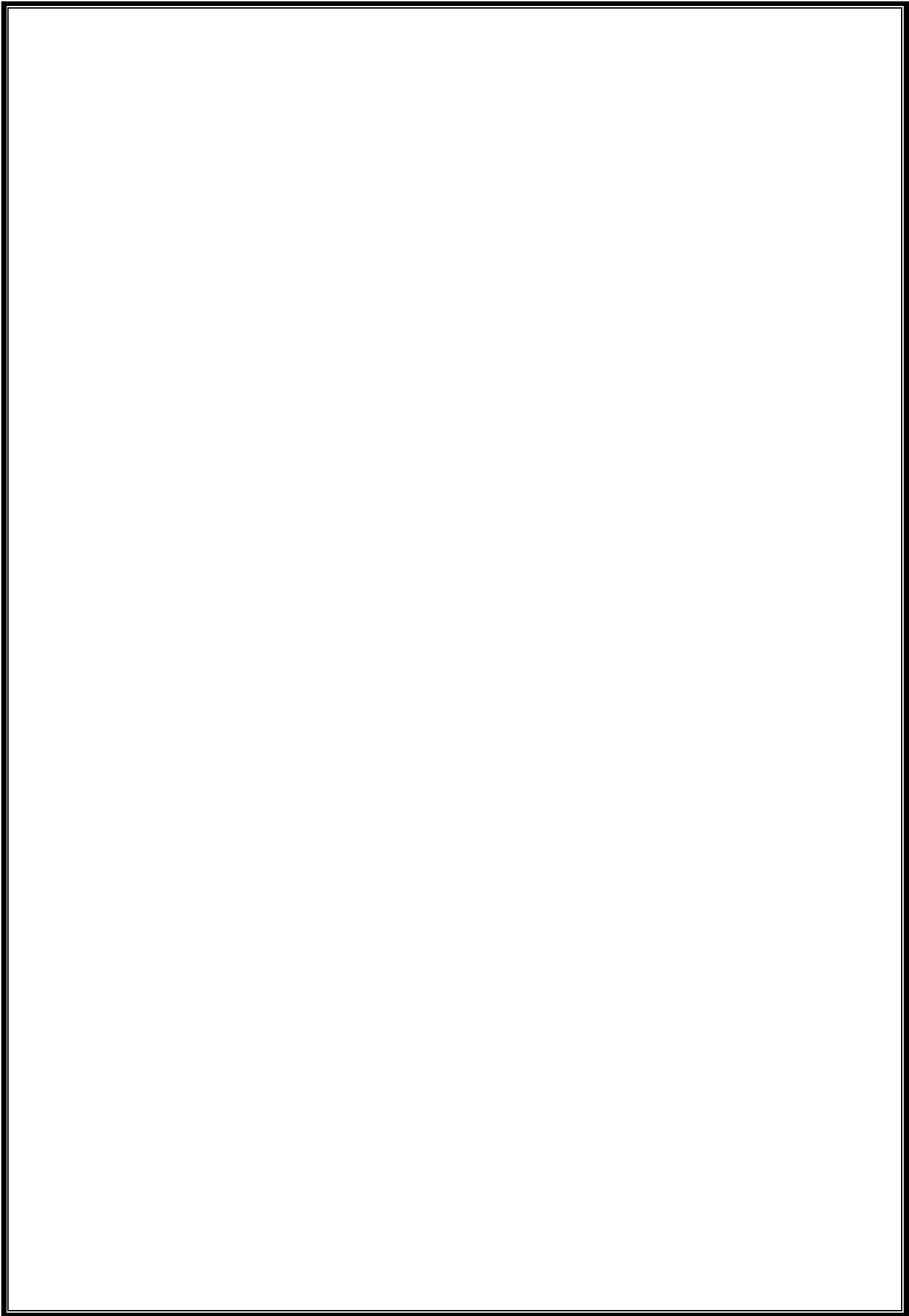
**Viva Questions:**

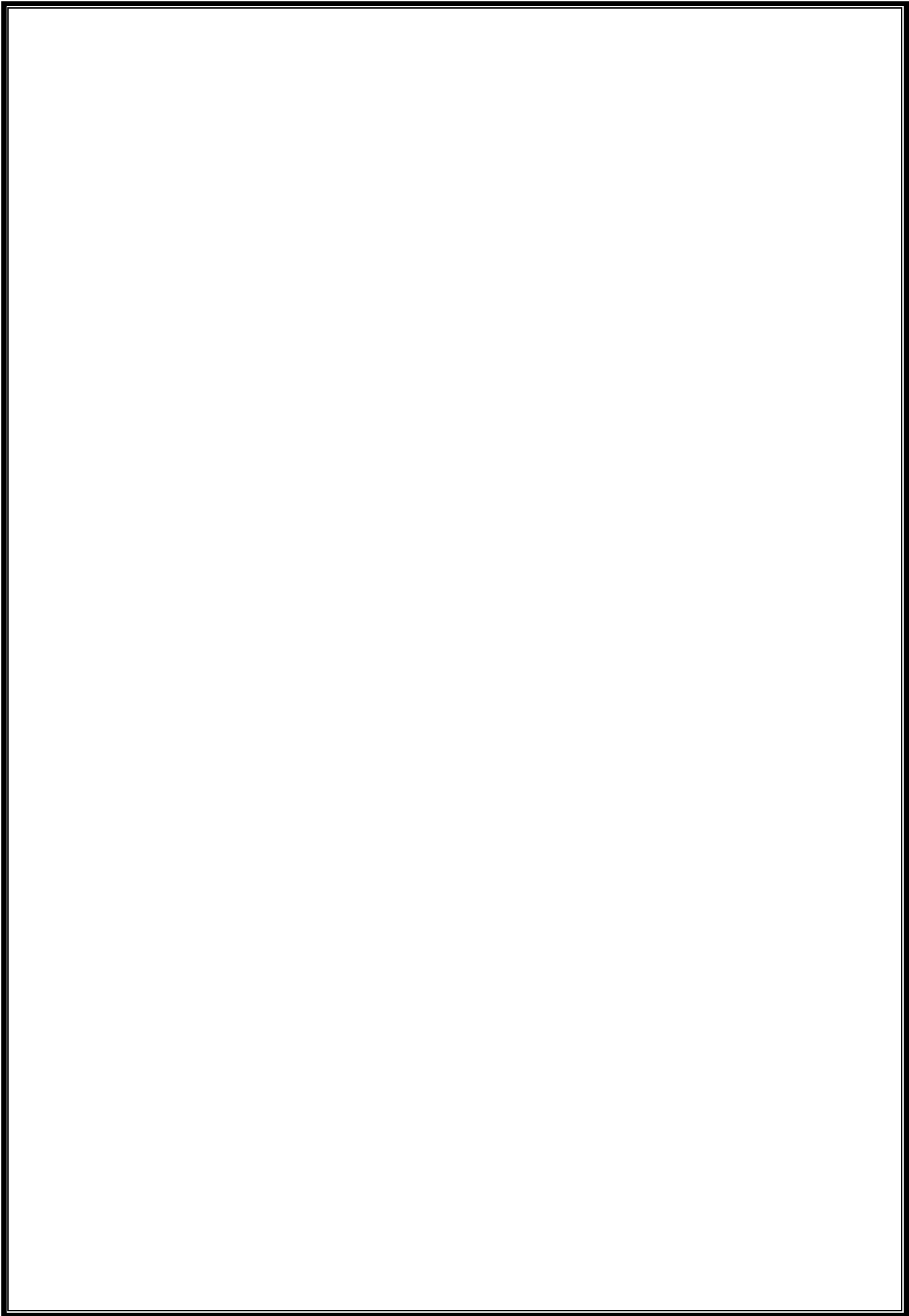
- 1. Define loop?
- 2. Write a python program to iterate over a list and string?
- 3. Demonstrate a python code for nested while loop?

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## **Record Notes**







### **PROGRAM-9**

**Date:**

A) Using a numpy module create an array and check the following:

1. Type of array 2. Axes of array
3. Shape of array 4. Type of elements in array

**Program:**

```
import numpy as np  
  
arr=np.array([[1,2,3],[4,2,5]])  
  
print("Array is of type:",type(arr))  
print("no.of dimensions:",arr.ndim)  
print("Shape of array:",arr.shape)  
print("Size of array:",arr.size)  
print("Array stores elements of type:",arr.dtype)
```

**Output:**

**Signature of the Faculty**

**Exercise Questions:**

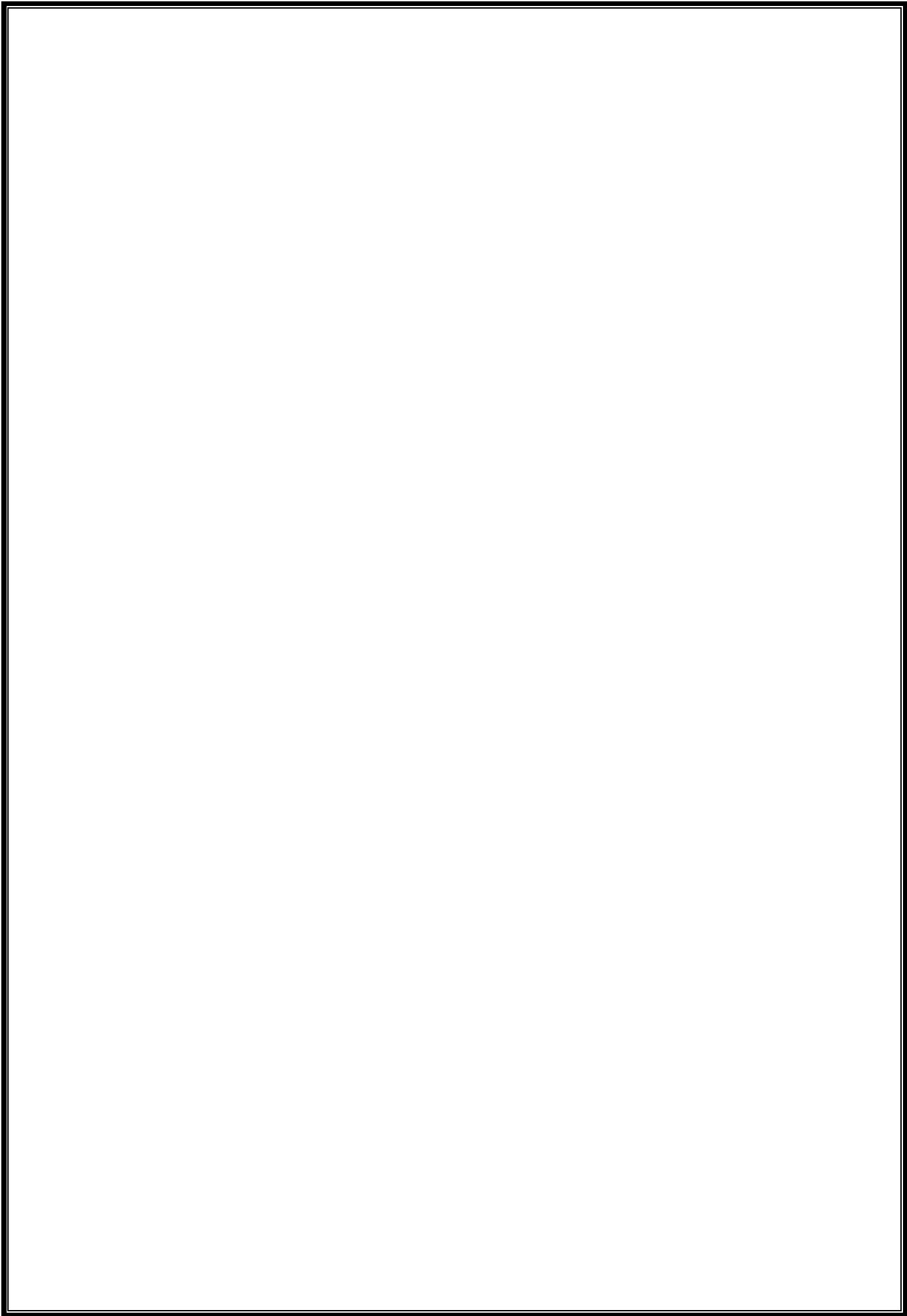
B) Using a numpy module create array and check the following:

1. List with type float
2. 3\*4 array with all zeros
- 3 . From tuple
4. Random values

**Viva Questions:**

1. Define array?
2. What is the purpose of numpy in python?
3. Difference between List and Array?

## **Record Notes**



## **PROGRAM-10**

**Date:**

**Aim:**

- A) Write python program in which an function is defined and calling that function prints Hello World

**Program:**

```
def hello():  
    print("Hello World")  
hello()
```

**Output:**

Hello World

**Exercise Questions:**

- B) Write python program in which an function (with single string parameter ) is defined and calling that function prints the string parameters given to function.  
C) Write a python program using with any one of python function argument?

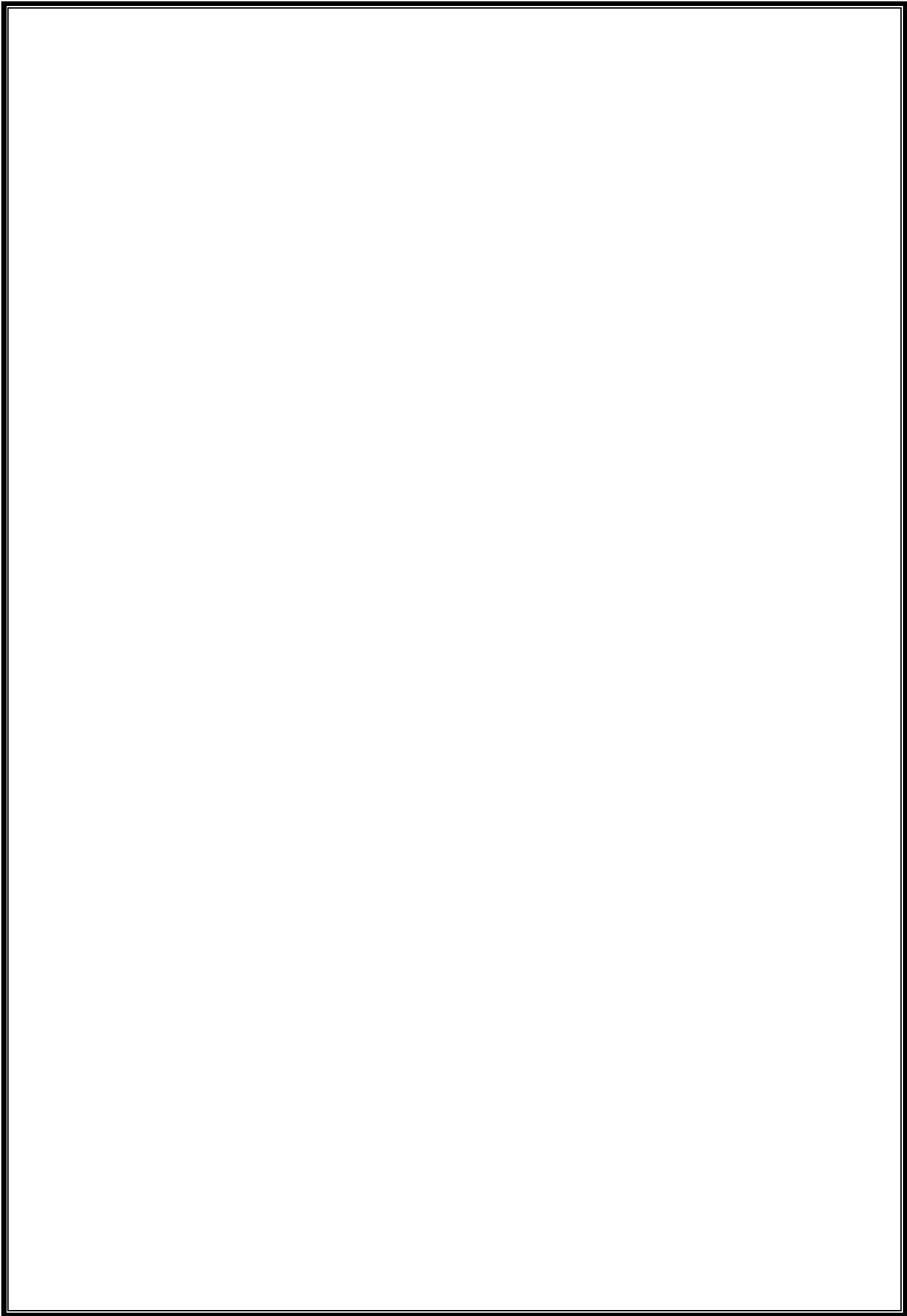
**Viva Questions:**

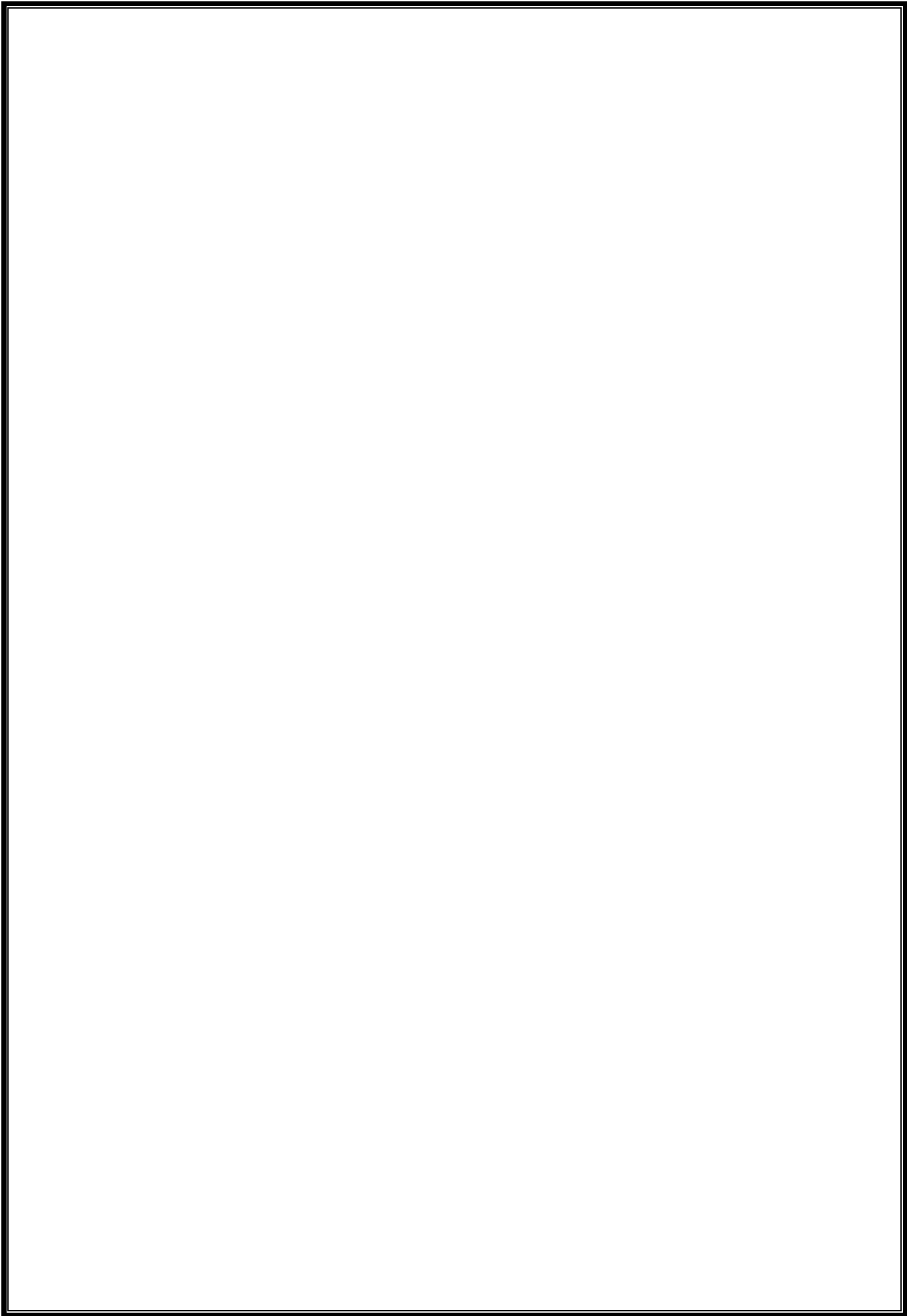
1. Define built-in and user defined function?
2. What are the different types of python function arguments?
3. Differentiate between parameter and arguments in functions?

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## **Record Notes**







**PROGRAM-11****Date:****Program:**

```
double=lambda x:2*x  
print(double(5))  
  
add = lambda x,y:x+y  
print(add(5,4))
```

**Output:**

```
10  
  
9
```

**Exercise Questions:**

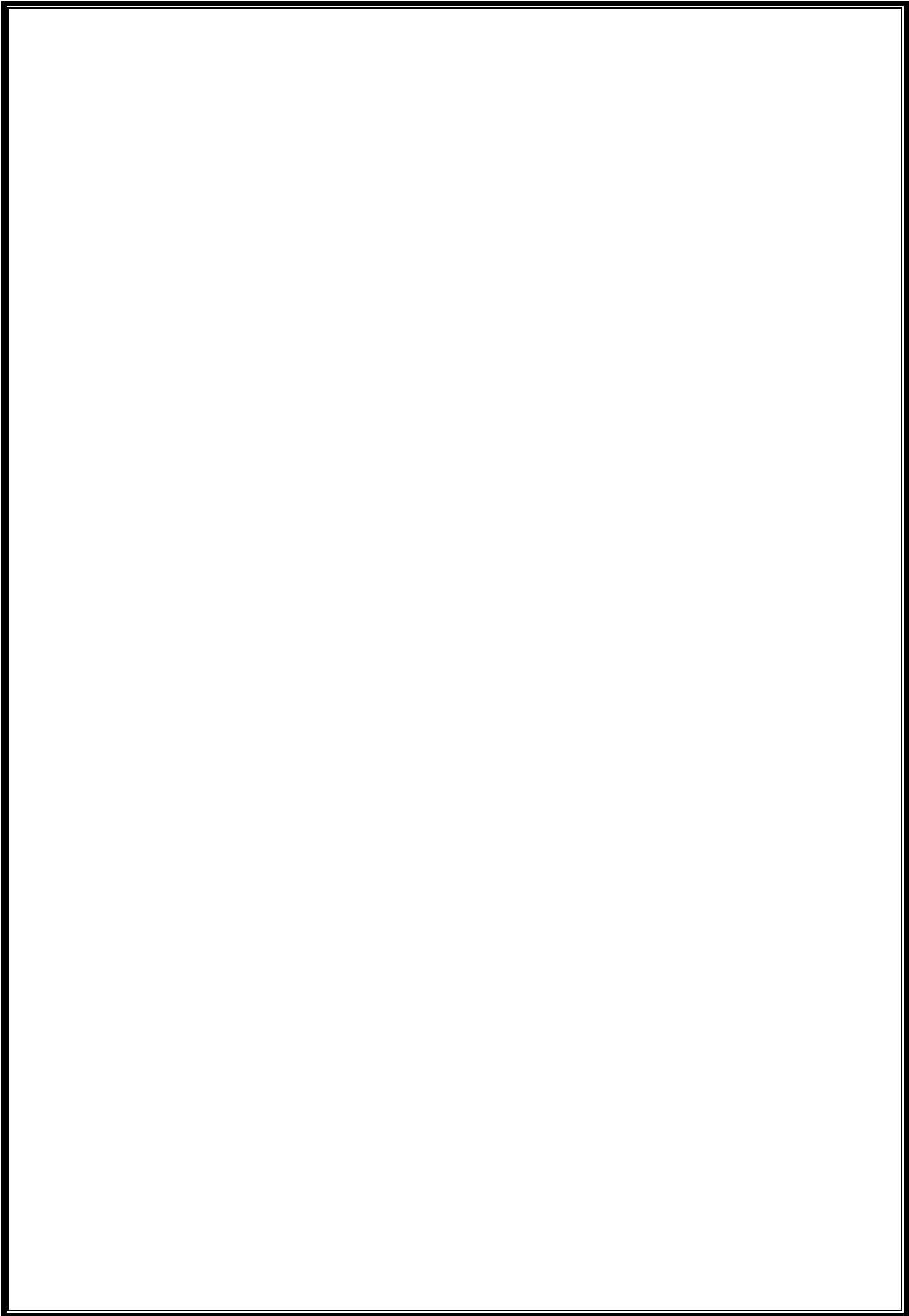
- B) Write a program for filter() to filter only even numbers from a given list.
- C) Write a program for map() function to double all the items in the list?
- D) Write a program to find sum of the numbers for the elements of the list by using reduce()?

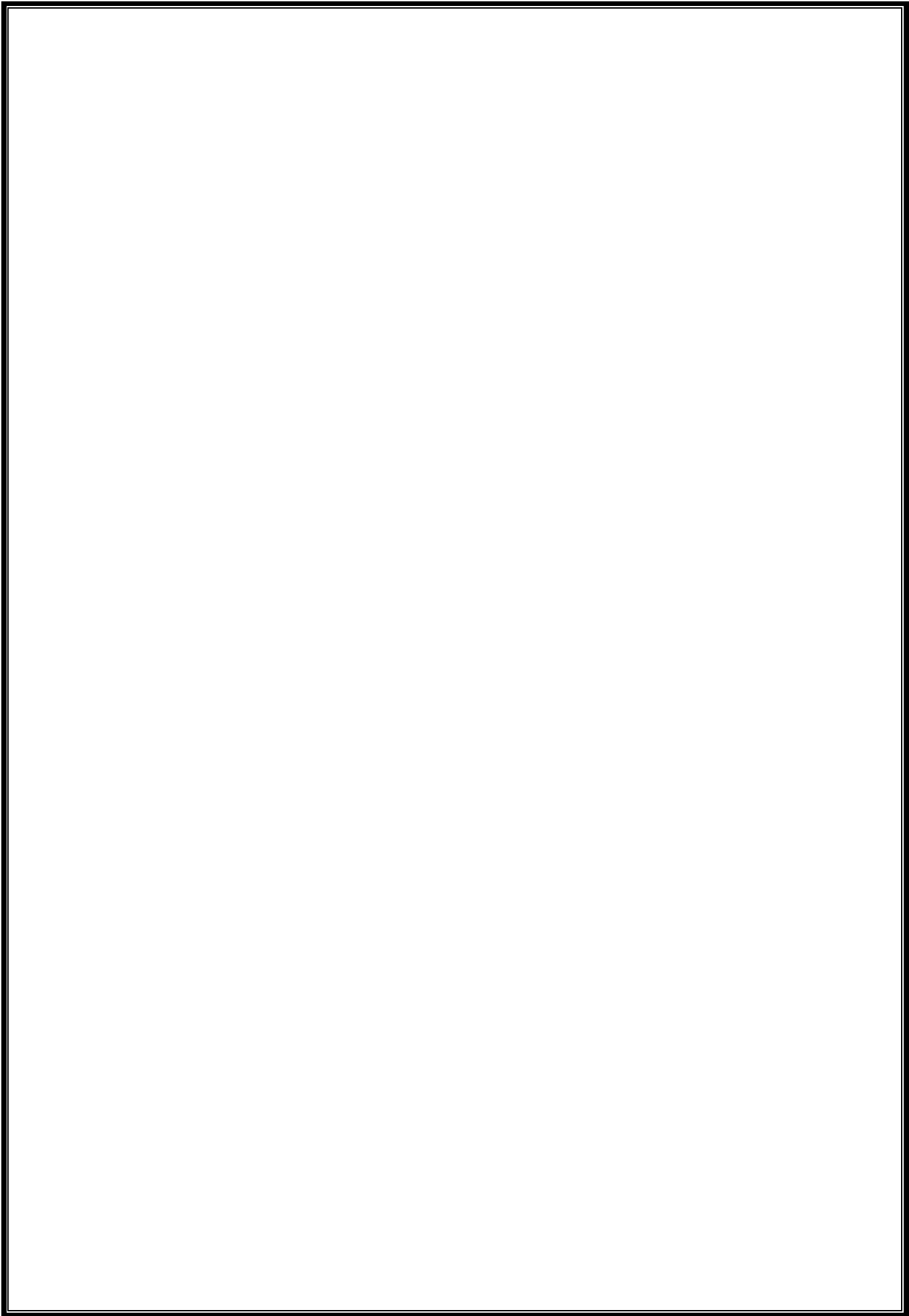
**Viva Questions:**

1. Define lambda function with syntax?
2. List out difference between built-in functions and anonymous functions?
3. Write the syntax for filter, map, and reduce functions?
4. Define fruitful functions?

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## **Record Notes**





## PROGRAM-12

**Date:**

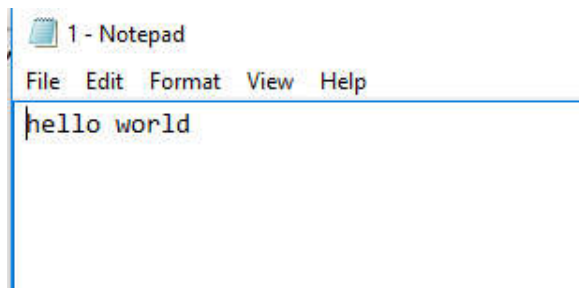
### **Aim:**

A) Write a python program to open and write “hello world” into a file?

### **Program:**

```
f=open("1.txt","a")  
f.write("hello world")  
f.close()
```

### **Output:**



```
C:\Users\MRCET\AppData\Local\Programs\Python\Python38-32\filess>type 1.txt  
hello world
```

If we keep on executing the same program for more than one time then it append the data that many times

```
C:\Users\MRCET\AppData\Local\Programs\Python\Python38-32\filess>type 1.txt  
hello worldhello world
```

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**Exercise Questions:**

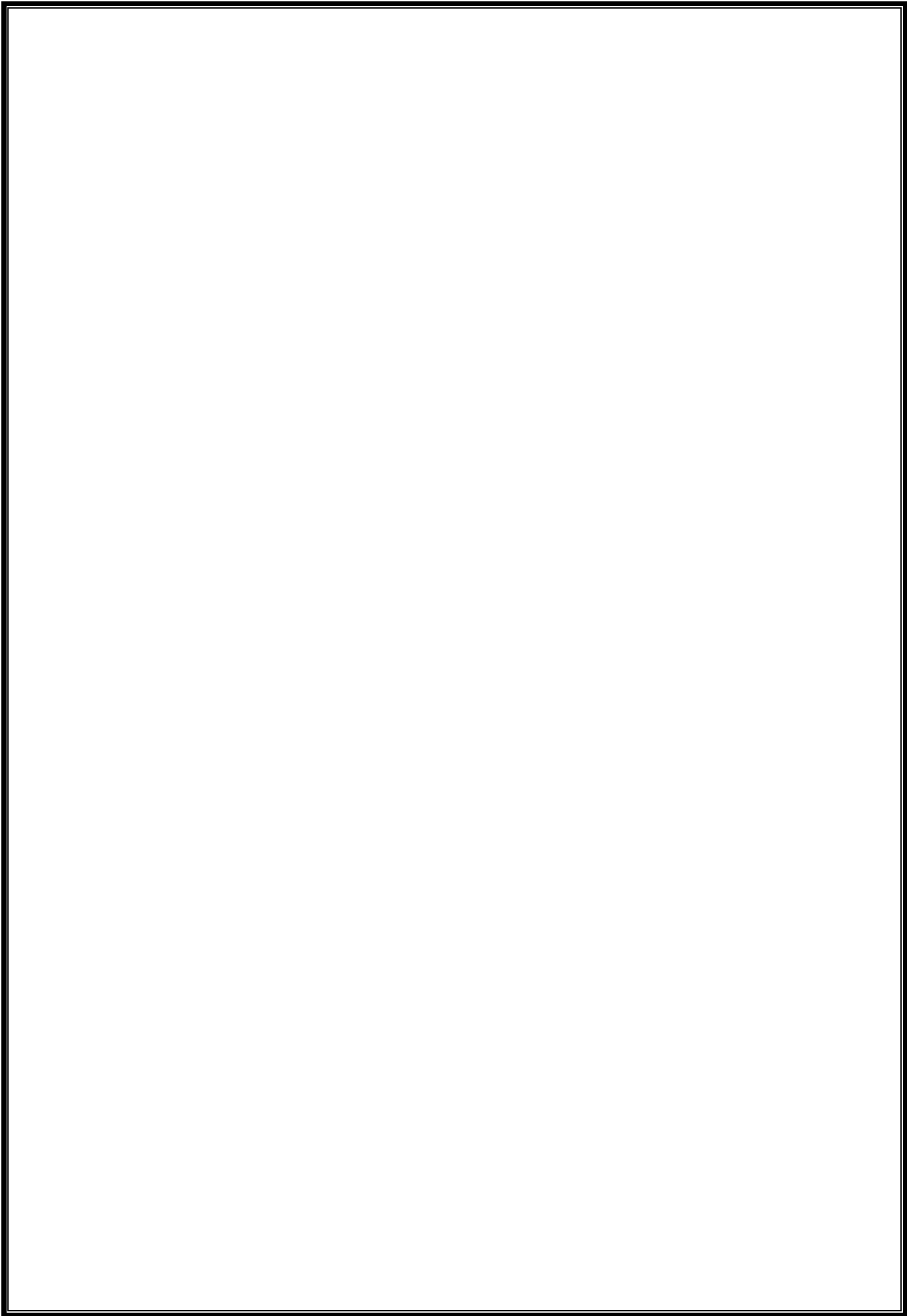
- A) Write a python program to write the content “hi python programming” for the existing file.
- B) Write a python program to concatenate two files into third file?

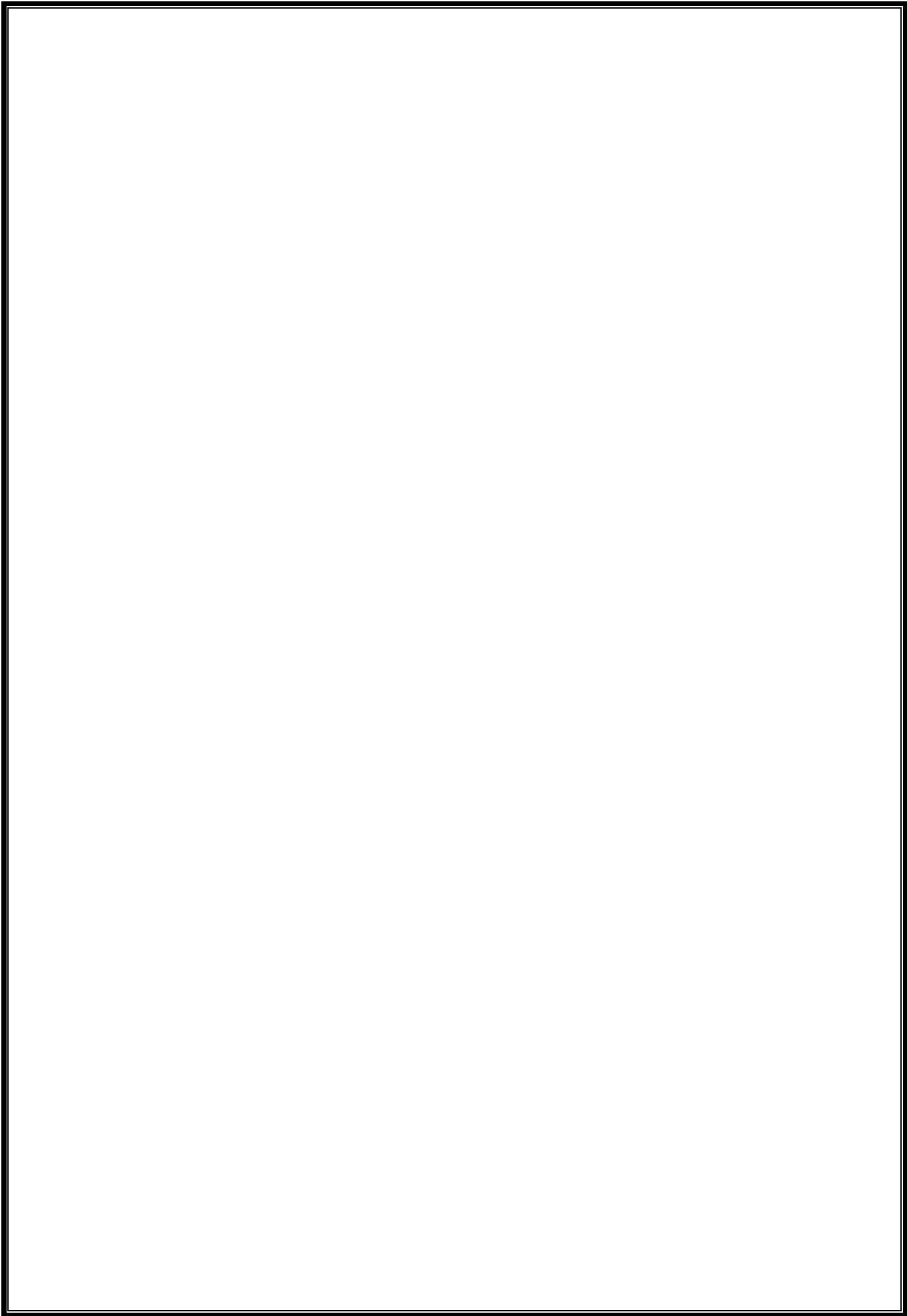
**Viva Questions:**

- A) Define file and list the different modes of a file?
- B) Differentiate between text file and binary file?
- C) Write the syntax to open a file?



**Record Notes**





## **PROGRAM-13**

**Date:**

**Aim:**

A) Write a python program to append data to an existing file and then displaying the entire file.

**Program:**

```
fp=open("abc.txt","w")
fp.write("Hello world")
fp.close()
fp=open("abc.txt","a")
fp.write("\nwelcome to python program")
fp.close()
fp=open("abc.txt","r")
print(fp.read())
fp.close()
```

**OUTPUT:**

Hello world  
welcome to python program

**Exercise Questions:**

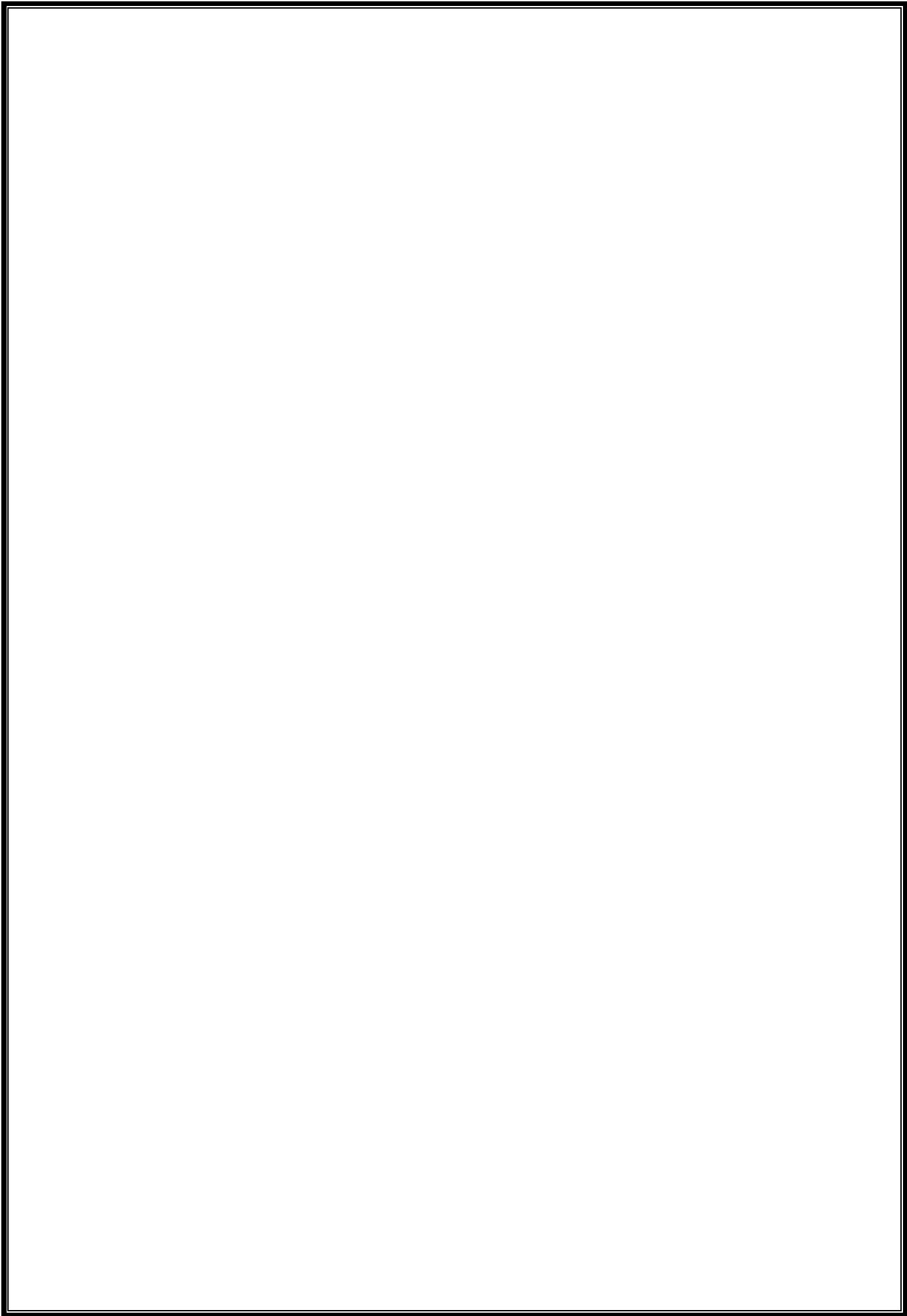
- 2) Write a python program to open a new file, add some data into it and display the contents of that file.?

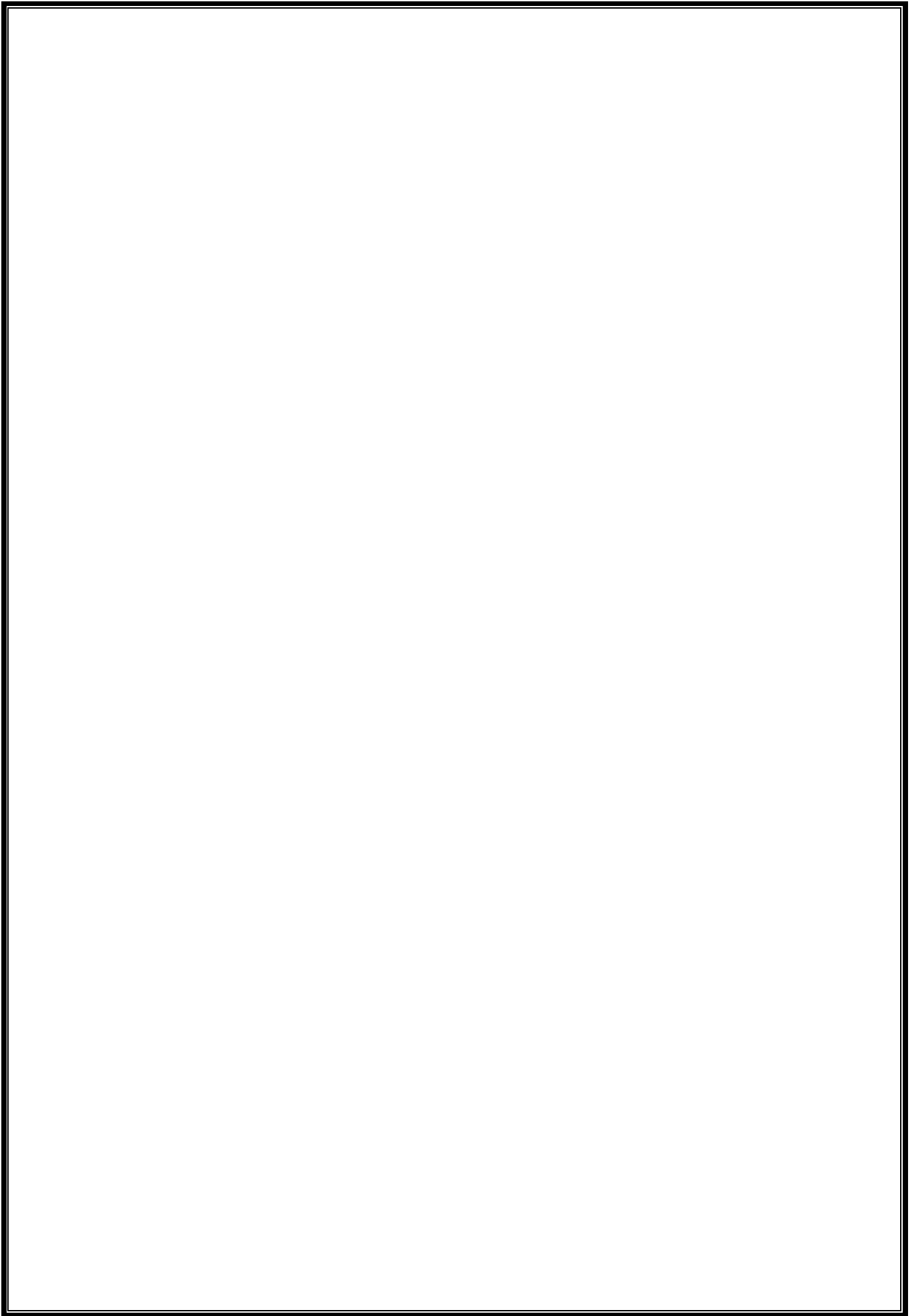
**Viva Questions:**

- 1) What are the file I/O operations in python?
- 2) What is the purpose of file modes in python?

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## **Record Notes**





## **PROGRAM-14**

**Date:**

**Aim:**

A) Write a python program to handle the ZeroDivisionError exception.

**PROGRAM:**

```
try:
    a = int(input('Enter a number: '))
    b = int(input('Enter a number: '))
    c = a / b
    print('Result: ', c)
except ZeroDivisionError:
    print('Exception_1: value of b can not be zero!')
else:
    print('No exception occurred!!!')
finally:
    print('This is executed compulsory!!!')
```

**Exercise Questions:**

1) Write a python program to demonstrate multiple except block with a single try block

**Viva Questions:**

- 1) What is an exception?
- 2) What is Runtime error?
- 3) Write the syntax of multiple exceptions in python?

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