COMPUTER SCIENCE WITH PYTHON (083)
BLUE PRINT

Type of Questions	Marks Per Question	Total Number of Questions	Total Marks
VSA: Very Short Answer Type	1	15	15
SA : Short Answer Type 1	2	17	34
SA : Short Answer Type 2	3	03	09
LA : Long Answer Type	4	03	12
Total		**38**	**70**

BLUE PRINT (Topic Wise)

Topic / Unit	VSA (1 mark)	SAI (2 marks)	SA II (3 marks)	LA (4 marks)	Total
Programming and Computational Thinking	2(2)	9(18)	2(6)	1(4)	14(30)
Computer Networks	4(4)	2(4)	1(3)	1(4)	8(15)
Data Management	7(7)	2(4)	-	1(4)	10(15)
Society, Law and Ethics	2(2)	4(8)	-	-	6(10)
Total	**15(15)**	**17(34)**	**03(09)**	**03(12)**	**38(70)**

Difficulty Level:
- Easy: 15%
- Average: 70%
- Difficult: 15%
- HOTS-based Questions: 20%

Time: 3 Hrs.   **M.M.:70**

1. (a) Differentiate between mutable and immutable objects in Python language with example. (2)
Ans.
Every variable in Python holds an instance of an object. There are two types of objects in Python, i.e.,
Mutable and Immutable objects. Whenever an object is instantiated, it is assigned a unique object id.
The type of the object is defined at the runtime and it can't be changed afterwards. However, its state
can be changed if it is a mutable object. For example, int, float, bool, string, unicode, tuple are
immutable objects in Python. In simple words, an immutable object can't be changed after it is
created. Lists, dictionaries and sets are mutable types.

(b) Write the modules that will be required to be imported to execute the following code in Python. (1)

```
def main( ):
    for i in range (len(string)) ):
        if string [i] = = ''
            print
        elif
            c=string[i].upper()
    print "string is:"c
    print "String length=",len(sring.floor())
```

Ans.
Math module and String module

(c) Observe the following Python code very carefully and rewrite it after removing all syntactical errors
with each correction underlined. (2)

```
DEF execmain():
    x = input("Enter a number:")
    if (abs(x)=x):
        print "You entered a positive number"
    else:
        x=*-1
        print "Number made positive:"x
execmain()
```

Ans.
Corrected code:

```
def execmain():
    x= input("Enter a number:")
    if(abs(x)== x):
        print("You entered a positive number")
    else:
        x *= -1
```

```
                print ("Number made positive:",x)
        execmain()
```

(d) Find the output of the following: (2)
```
        def main ( ) :
                Moves=[11, 22, 33, 44]
                Queen=Moves
                Moves[2]+=22
                L=Len(Moves)
                For i in range (L)
                        print "Now@", Queen[L-i-1], "#", Moves [i]
```
Ans.
Now @ 44 # 11
Now @ 55 # 22
Now @ 22 # 55
Now @ 11 # 44

(e)Write the output of the following Python program code: (2)
```
        def ChangeList():
                L=[]
                L1=[]
                L2=[]
                for i in range(1,10):
                        L.append(i)
                for i in range(10,1,-2):
                        L1.append(i)
                for i in range(len(L1)):
                        L2.append(L1[i]+L[i])
                L2.append(len(L)-len(L1))
                print(L2)
        ChangeList()
```

Ans.
Output is: [11,10,9,8,7,4]

(f)Study the following program and select the possible output(s) from the options (i) to (iv) following it.
Also, write the maximum and the minimum values that can be assigned to the variable Y. (2)
```
        import random
        X= random.random()
        Y= random.randint(0,4)
        print(int(X),":",Y+int(X))
```
(i)0 : 0
(ii) 1 : 6
(iii)2 : 4
(iv) 0 : 3

Ans.
(i) and (iv) are the possible outputs. Minimum value that can be assigned is – Y = 0. Maximum value that can be assigned is – Y = 3

2. (a) List one similarity and one difference between List and Dictionary data type. (1)
Ans.
Similarity: Both List and Dictionary are mutable data types.
Dissimilarity: List is a sequential data type i.e. they are indexed. Dictionary is a mapping data type. It consists of key: value pair.
For example, L =[1,2,3,4,5] is a list
D = {1:"Ajay", 2:"Prashant", 4:"Himani"} is a dictionary where 1, 2, 4 are keys and "Ajay", "Prashant", "Himani" are their corresponding values.

(b) Rewrite the following Python program after removing all the syntactical errors (if any), underlining each correction.:(2)

```
def checkval:
    x = input("Enter a number")
    if x % 2 = 0:
        print x,"is even"
    else if x<0:
        print x,"should be positive"
    else;
        print x,"is odd"
```

Ans. Corrected code:

```
def checkval():
    x = int(input("Enter a number:"))
    if x % 2 == 0:
        print(x," is even")
    elif x<0:
        print(x, "should be positive")
    else:
        print(x, "is odd")
```

(c) Find the output of the following: (2)

```
def makenew(mystr):
    newstr = ""
    count = 0
    for i in mystr:
        if count%2 != 0:
            newstr = newstr + str(count)
        else:
            if i.islower():
                newstr = newstr + i.upper()
            else:
                newstr = newstr + i
        count += 1
    newstr = newstr + mystr[:1]
```

```
            print("The new string is:", newstr)
        makenew("sTUdeNT")
```
Ans.

The new string is: S1U3E5Ts

(d) Discuss the strategies employed by python for memory allocation? (2)

Ans.

Python uses two strategies for memory allocation- Reference counting and Automatic garbage collection:

Reference Counting: works by counting the number of times an object is referenced by other objects in the system. When an object's reference count reaches zero, Python collects it automatically.

Automatic Garbage Collection: Python schedules garbage collection based upon a threshold of object allocations and object de-allocations. When the numbers of allocations minus the number of deallocations are greater than the threshold number, the garbage collector is run and the unused block of memory is reclaimed.

3. (a) Write a user defined function findname(name) where name is an argument in Python to delete phone number from a dictionary phonebook on the basis of the name, where name is the key. (3)

Ans.

```
    def findname(name):
        if phonebook.has_key():
            del phonebook[name]
        else:
            print("Name not found")
        print("Phonebook Information")
        print("Name",'\t', "Phone number")
        for i in phonebook.keys():
            print(i,'\t', phonebook[i])
```

(b) Write the specific purpose of functions used in plotting: (2)

i) plot()

ii) Legend()

Ans.

i) plot(): A line chart or line graph can be created using the plot() function available in pyplot library. For example, the basic syntax for creating line plots is plt.plot(x,y), where x and y are the points or specify the (x, y) pairs that form the line.

ii) Legend(): legend is the text or string that "has to be read" to understand the graph. Legends are used in line graphs to explain the function or the values underlying the different lines of the graph.

(c) Write a python program to plot the algebraic equation: 10x + 14. (3)

Ans.

Program to evaluate an algebraic expression 10x + 14 using Line Chart

```
    import numpy as np
    from matplotlib import pyplot as plt
    x = np.arange(12, 20)
    y = 10 * x + 14
    plt.title("Graph for an Algebraic Expression")
```

```
plt.xlabel("x axis")
plt.ylabel("y label")
plt.plot(x,y)
plt.show()
```

(d) Write definition of a Method MSEARCH(STATES) to display all the state names from a list of STATES, which are starting with alphabet M. (2)
For example: If the list STATES contains ["MP","UP","WB","TN","MH","MZ","DL","BH","RJ","HR"]
The following should get displayed
MP
MH
MZ

Ans.
```
def MSEARCH(STATES):
    for i in STATES:
        if i[0]=='M':
            print(i)
```

(e)Observe the following code and answer the questions that follow: (2)
```
File = open("Mydata","a")  _____  #Blank1
File.close()
```
(i)What type (Text/Binary) of file is Mydata?
(ii)Fill in Blank 1 with a statement to write "ABC" in the file "Mydata".

Ans.
(i) Text File
(ii)File.write("ABC")

4. (a) Write any one advantage and one disadvantage of Coaxial cable. (1)
Ans.
Advantages:
•It is less susceptible to noise or interference (EMI or RFI) as compared to twisted pair cable.
•It supports high bandwidth signal transmission as compared to twisted pair.
•It is easy to wire and easy to expand due to its flexibility.
Disadvantages:
•It is bulky.
•It is expensive to install for longer distances due to its thickness and stiffness.

(b)Riana Medicos Centre has set up its new centre in Dubai. It has four buildings as shown in the diagram given below: (4)
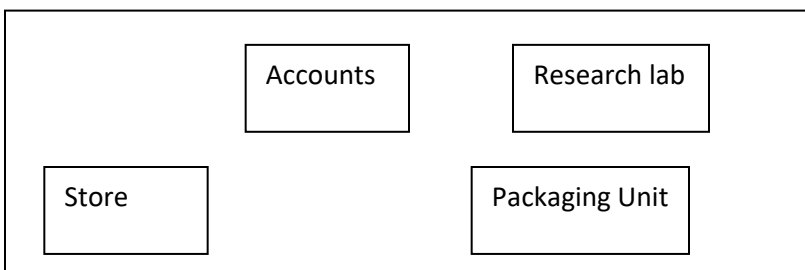
Distances between various buildings are as follows:

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packaging Unit	125 m
Store to Research Lab	180 m

Number of computers:

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

As a network expert, provide the best possible answer for the following queries:
(i) Suggest the type of network established between the buildings.
Ans.
LAN (Local Area Network)

(ii)Suggest the most suitable place (i.e., building) to house the server of this organization.
Ans.
Research Lab as it has the maximum number of computers.

(iii)Suggest the placement of the following devices with justification: (a) Repeater (b) Hub/Switch
Ans.
(a) Repeater: It should be placed between Accounts and Packaging Unit, Accounts to Research Lab, Store to Research Lab and Accounts to Packaging Unit.
(b) Switch should be placed in each of the buildings for better traffic management.

(iv) Suggest a system (hardware/software) to prevent unauthorized access to or from the network.
Ans.
Firewall.

(c) How does IP address differ from MAC address? (2)
Ans.
IP address is a number assigned to the connection in a network. The basic difference between MAC address and IP address is that a MAC address uniquely identifies a device that wants to take part in a network. On the other hand, an IP address uniquely defines a connection of a network with an interface of a device.

(d) Expand the following: (3)
(i) VoIP
Ans.
Voice over Internet Protocol

(ii) SMTP

Ans.

Simple Mail Transfer Protocol

(iii) TDMA

Ans.

Time Division Multiple Access

5.(a) Write difference between IP v-4 and IPv-6. (2)

Ans.

The difference between IPv4 and IPv6 Addresses. An IP address is binary numbers but can be stored as text for human readers. For example, a 32-bit numeric address (IPv4) is written in decimal as four numbers separated by periods. IPv6 addresses are 128-bit IP address written in hexadecimal and separated by colons.

(b) Write the purpose of following commands (3)

1. whois
2. ipconfig
3. nslookup

Ans.

1. whois: Lookup tool finds contact information for the owner of a specified IP address. The ipwhois Lookup tool displays as much information as possible for a given IP address.

2. ipconfig: In Windows, ipconfig is a console application designed to run from the Windows command prompt. This utility allows you to get the IP address information of a Windows computer. It also allows some control over active TCP/IP connections.

3. nslookup: is a network administration command-line tool available for many computer operating systems. It is used for querying the Domain Name System (DNS) to obtain domain name or IP address mapping information.

5. (a) Write the difference between GET and POST method. (2)

Ans.

A web browser may be the client and an application on a computer that hosts a website may be the server.So,to request a response from the server, there are mainly two methods:

(i)GET : to request data from the server

(ii)POST : to submit data to be processed to the server

(b)Write a MySQL-Python connectivity to retrieve data, one record at a time, from city table for employees with id less than 10. (2)

Ans.

```python
import MySQLdb as my
try:
    db = my.connect(host="localhost",
                    user="root", passwd="",
                    database="India")
    cursor = db.cursor()
    sql = "select * from city where id < 10"
    number_of_rows = cursor.execute(sql)
```

```
        print(cursor.fetchone()) # fetch the first row only
        db.close()
    except my.DataError as e:
        print("DataError")
        print(e)
```

(c)What are the basic steps to connect Python with MYSQL using table Members present in the database 'Society'? (2)
Ans.

```
import MySQLdb
conn = MySQLdb.connect(host="localhost",
                        user='root', password =' ',
                        database="Society")
cursor= conn.cursor()
cursor.execute('SELECT  COUNT(MemberID)  as  count  FROM  Members
WHERE id = 1')
row = cursor.fetchone()
conn.close()
print(row)
```

(d)What is the role of Django in website design? (1)
Ans.
Django is a high-level Python web framework, designed to help build complex web applications simply and quickly. Django makes it easier to build better web apps quickly and with less code.

6. (a) Write the steps to connect with database "testdb" with Python programming. (2)
Ans.
Steps to be followed are:
•Import mysqldb as db
• Connect
• Cursor
• Execute
• Close

(c)Which method is used to retrieve all rows and single row? (1)
Ans.
fetchall(), fetchone()

(d)Table COACHING is shown below. Write commands in SQL for (i) to (iii) and show the output for (iv) and (v) (5)

ID	NAME	AGE	CITY	FEE	PHONE
P1	SAMEER	34	DELHI	45000	9811076656
P2	ARYAN	35	MUMBAI	54000	9911343989
P4	RAM	34	CHENNAI	45000	9810593578
P6	PREMLATA	36	BHOPAL	60000	9910139987

| P7 | SHIKHA | 36 | INDORE | 34000 | 9912139456 |
| P8 | RADHA | 33 | DELHI | 23000 | 8110668888 |

(i)Write a query to display name in descending order whose age is more than 23.
Ans.
select name from coaching where age>23 order by name desc;

(ii)Write a query to find the average fee grouped by age from customer table.
Ans.
select avg(fee) from coaching group by age;

(iii) Write query details from coaching table where fee is between 30000 and 40000.
Ans.
Select * from coaching table where fee is between 30000 and 40000;

(iv)Select sum(Fee) from coaching where city like "%O% ;
Ans.
94000

(v)Select name, city from coaching group by age having count(age)>2;
Ans.
Empty set

7. (a) What are the proper methods and steps for the disposal of used electronic items? (1)
Ans.
 Explanation about any methods like:
• Landfilling
• Acid Bath
• Incineration
• Recycling of e-waste
•Reuse of electronic devices

(b) What are Intellectual Property Rights (IPR)? (1)
Ans.
IPR is a general term covering patents, copyright, trademark, industrial designs, geographical indications, layout design of integrated circuits, undisclosed information (trade secrets) and new plant varieties.

(c) How can we recycle e-waste safely? (2)
Ans.
(i) Use a certified e-waste recycler.
(ii) Visit civic institutions. Check with your local government, schools and universities for additional responsible recycling options.
(iii) Explore retail options.
(iv) Donate your electronics.

(d) What is meant by the term Cyber Forensics? (2)

Ans.

Cyber forensics is an electronic discovery technique used to determine and reveal technical criminal evidence. It often involves electronic data storage extraction for legal purposes. Although still in its infancy, cyber forensics is gaining traction as a viable way of interpreting evidence. Cyber forensics is also known as computer forensics.

(e) Write any two categories of cyber crime. (2)

Ans.

Cyber crime encompasses a wide range of activities, but these can generally be broken into two categories:

•Crimes that target computer networks or devices: Such types of crimes include viruses and denial-of-service (DoS) attacks.

•Crimes that use computer networks to advance other criminal activities: These types of crimes include cyberstalking, phishing and fraud or identity theft.

(f) How does phishing happen? (2)

Ans.

Phishing is a fraudulent attempt to obtain sensitive information such as usernames, passwords, and credit card details (and money), often for malicious reasons, by disguising as a trustworthy entity in an electronic communication. Phishing is typically carried out by email spoofing or instant messaging, and it often directs users to enter personal information at a fake website, the look and feel of which is identical to the legitimate one and the only difference is the URL of the website in question.