Max. Marks: 70   Time: 3 hrs.

General Instructions:
● All questions are compulsory.

SECTION-A

1. a) Which of the following is valid logical operator in Python: 1
        (i) **   (ii) ?   (iii) <   (iv) and

    b) Write the type of tokens(keyword, identifier) from the following: 1
        (i) and   (ii) While

    c) Name the Python Library modules which need to be imported to invoke the following functions: 1
        (i) pow()   (ii) isdigit()

    d) Rewrite the following code in python after removing all syntax error(s). Underline each correction   2
        done in the code.

```
Val = int(input("Value:"))
Adder = 0
for C of range(1,Val,3)
    Adder=Adder + C
    if C%2=0:
        print(C*10)
    Else:
        print(C)
print (Adder)
```

    e) Find and write the output of the following python code: 2

```
def fun(s):
    n = len(s)
    m=""
    for i in range(0, n):
        if (s[i] >= 'a' and s[i] <= 'm'):
            m = m +  s[i].upper()
        elif (s[i] >= 'n' and s[i] <= 'z'):
            m = m +  s[i-1]
        elif (s[i].isupper()):
            m = m +  s[i].lower()
        else:
            m = m +  '#'
    print(m)

fun('Abc@com')
```

    f) Find and write the output of the following python code: 3

```
def Change(P, Q=30):
        P=P+Q
        Q=P-Q
        print(P,"#",Q)
        return(P)
R=150
S=100
R=Change(R,S)
print(R,"#",S)
S=Change(S)
```

g) What possible output(s) are expected to be displayed on screen at the time of execution of the program from the following Python code? Also specify the minimum values that can be assigned to each of the variables Start and End.   2

```
import random

VAL=[80,70,60,50,40,30,20,10]

Start=random.randint(1,3)
End=random.randint(Start,4)

for I in range(Start,End+1):
    print (VAL[I],"*",end = "")
```

(i) 40 * 30 * 20 * 10 *   (ii) 70 * 60 * 50 * 40 * 30 *
(iii) 50 * 40 * 30 *   (iv) 60 * 50 * 40 * 30 *

2. a) What does the following code display?   1

```
numbers = [1, 2, 3, 4, 5, 6, 7, 8]
print(numbers[-4:])
```

b) What will the following code display?   1

```
dct = {'January':1, 'February':2, 'March':3}
print(dct['February'])
```

c) Identify the valid declaration of *values*:   1
```
values = ('physics', 'chemistry', 1997, 2000)
```

(i) list   (ii) dictionary   (iii) array   (iv) tuple

d) Find and write the output of the following python code: 1

```
List = ["P", 20, "R", 10, "S", 30]
Times = 0
Alpha = ""
Sum = 0
for I in range(1, 6, 2):
    Times = Times + I
Alpha = Alpha + List[I - 1] + "#"
Sum = Sum + List[I]
print(Times, Sum, Alpha)
```

e) Find and write the output of the following python code: 1

```
a = "Guido Van Rossum"
a = a.split()
b = a[0][0] + ". " + a[1][0] + ". " + a[2]
print (b)
```

f) What is recursion and how it works? Explain with an example.   2

g) A pie chart is a circular statistical graphic, which is divided into slices. Write the code to draw a pie chart using pyplot to represent sales data for the sales of cars of four weeks. Data is given in following table: 2

Labels	Sales	Color of slice
Week1	10	Gold
Week2	16	Green
Week3	14	Blue
Week4	11	Red

OR

Give the output from the given python code:

```
import matplotlib.pyplot as plt

t = np.arange(0.0, 20.0, 1)
s = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20]
plt.plot(t, s)

plt.xlabel('Item (s)')
plt.ylabel('Value')
plt.title('Python Line Chart')
plt.grid(True)
plt.show()
```

h) Write a function in python to count the number of words in a text file '**STORY.TXT'** which is starting with an alphabet **'a'**.   2
<p align="center">OR</p>
Write a function in python to read lines from a text file **STORY.TXT**, and display those lines, which are not starting with alphabet 'A'.

i) Define a function that accepts a list of numbers as an argument. The function should recursively calculate the sum of all the numbers in the list and return that value.   3
<p align="center">OR</p>
Define a function that uses recursion to raise a number to a power. The function should accept two arguments: the number to be raised and the exponent. Assume that the exponent is a nonnegative integer.

j) Write a function in Python, INSERTQ(Arr,data) and DELETEQ(Arr) for performing insertion and deletion operations in a Queue. Arr is the list used for implementing queue and data is the value to be inserted.   4
<p align="center">OR</p>

Write a function in python, MakePush(Package) and MakePop(Package) to add a new Package and delete a Package from a List of Package. Description, considering them to act as push and pop operations of the Stack data structure.

SECTION-B

3. Fill in the blanks   4

a) ……………………….. is a platform where embedded devices are connected to the internet, so they can collect and exchange data with each other.

b) In ……………………….. computing, the client requests a resource and the server provides that resource.

c) ……………………….. is an electronic device that amplifies the received signal and then retransmits it on the network.

d) ……………………….. is the Internet's system for converting alphabetic names into numeric IP addresses.

e) Give the full forms of the following: 2
   I.   SCP
   II.   IMAP
   III. SMTP
   IV.   NFC

f) What is Traceroute? What it is used for?   2

g) Write the difference between amplitude modulation and frequency modulation.   3

h) Ayurveda Training Educational Institute is setting up its centre in Hyderabad with four specialised departments for Orthopedics, Neurology and Pediatrics along with an administrative office in separate buildings. The physical distances between these department buildings and the number of computers to be installed in these departments and administrative office are given as follows. You, as a network expert, have to answer the queries as raised by them in (i) to (iv).
Shortest distances between various locations in meters :

Administrative Office to Orthopedics Unit	55
Neurology Unit to Administrative Office	30
Orthopedics Unit to Neurology Unit	70
Pediatrics Unit to Neurology Unit	50
Pediatrics Unit to Administrative Office	40
Pediatrics Unit to Orthopedics Unit	110

Number of Computers installed at various locations are as follows :

Pediatrics Unit	40
Administrative Office	140
Neurology	50
Orthopedics Unit	80
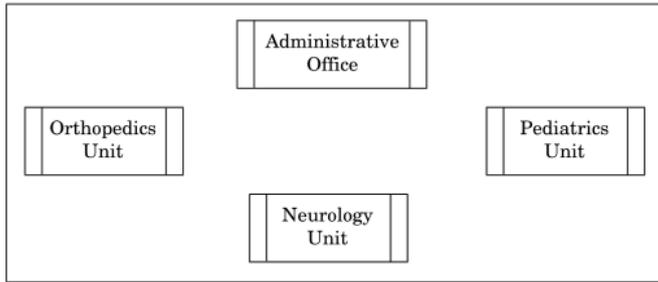
(i)   Suggest the most suitable location to install the main server of this institution to get efficient connectivity.   1

(ii) Suggest the best cable layout for effective network connectivity of the building having server with all the other buildings.   1

(iii) Suggest the devices to be installed in each of these buildings for connecting computers installed within the building out of the following :   1
      • Gateway • Modem • Switch

(iv) Suggest the topology of the network and network cable for efficiently connecting each computer installed in each of the buildings out of the following :   1
      Topologies : Bus Topology, Star Topology
      Network Cable : Single Pair Telephone Cable, Coaxial Cable, Ethernet Cable

SECTION-C

4. a) Which command is used to create structure of the table?   1

    b) Which aggregate function is used to find average value of a particular column   1

    c) Which clause is used to enables SQL aggregate functions for grouping of information.   1

    d) What is the importance of primary key in a table? Explain with suitable example.   1

    e) Differentiate between union and Cartesian product.   2

    f) Differentiate between Django GET and POST method.   2

    g)   Write a output for SQL queries (i) to (iii), which are based on the tables: 3

    TABLE : ACCOUNT

ANO	ANAME	ADDRESS
101	Nirja Singh	Bangalore
102	Rohan Gupta	Chennai
103	Ali Reza	Hyderabad
104	Rishabh Jain	Chennai
105	Simran Kaur	Chandigarh

TABLE : TRANSACT

TRNO	ANO	AMOUNT	TYPE	DOT
T001	101	2500	Withdraw	2017-12-21
T002	103	3000	Deposit	2017-06-01
T003	102	2000	Withdraw	2017-05-12
T004	103	1000	Deposit	2017-10-22
T005	101	12000	Deposit	2017-11-06

i) SELECT ANO, ANAME FROM ACCOUNT WHERE ADDRESS NOT IN ('CHENNAI', 'BANGALORE');

ii) SELECT DISTINCT ANO FROM TRANSACT;

iii) SELECT ANO, COUNT(*), MIN(AMOUNT) FROM TRANSACT GROUP BY ANO HAVING COUNT(*)> 1;

h) Write SQL queries for (i) to (iv), which are based on the table: STUDENT given in the question 4(g)   4

i) To display details of all transactions of TYPE Deposit from Table TRANSACT.

ii) To display the ANO and AMOUNT of all Deposits and Withdrawals done in the month of October 2017 from table TRANSACT.

iii) To display the last date of transaction (DOT) from the table TRANSACT for the Accounts having ANO as 103.

iv) To display all ANO, ANAME and DOT of those persons from tables ACCOUNT and TRANSACT who have done transactions less than or equal to 3000.

SECTION-D

5. a) What items are considered e-waste?   1

b) Write two examples of identity theft.   1

c) Differentiate between open source and open data.   2

d) Why is digital rights management important?   2

e) How does technology affect culture?   2

f) Enumerate any two disability issues while teaching and using computers.   2