This question paper contains 8+2 printed pages]   3|11|19 E

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt any **5** of Question Nos. **2** to **8**.

All parts of a question must be answered together.

Due credit will be given to the structure and documentation

of the code. For every program/function you must

include as comments the following :

Objective :

inputs/input parameters :

outputs/output parameters :

P.T.O.

1. (a) For each of the following, indicate whether it is a valid Python keyword.

2

    (i) class

    (ii) not

    (iii) if

    (iv) exec

(b) How does the effect of the following two statements differ ?

2

    (i) `a -= a - 3`

    (ii) `a = a - 3`

(c) Give the output that will be produced on execution of the following code segment :

2

```
s1 = "learning python is FUN!!"

s2 = s1.capitalize()

s3 = s1.title()

print(s2)

print(s3)
```

(*d*) Consider a queue q. Write a Python function display() that displays content of queue q if queue is not empty, otherwise, it displays the message "Queue is Empty". 2

(*e*) Identify error(s), if any, in the following code segment : 2

```
s1  =  "I  am  a  String"

s1[4]  =  "not"

print("String  s1  is  " +  S1)
```

(*f*) Give the output that will be produced on execution of the following code segment : 3

```
f  =  10

m  =  4

for  i  in  range(f,  0,  -1):

    p  =  m  *  i

    print(p)
```

(g) Give the output that will be produced on execution of the following code segment :   3

```
v = 5
def sum(n1, n2):
    v = n1 + n2
    print("v inside sum: ", v)
print("v before sum:", v)
sum(7, 3)
print("v after sum:", v)
```

(h) Write a Python function factors(x) that takes an integer value x and find factors of x.   4

(i) Give the output that will be produced on execution of the following code segment :   5

```
list1 = [1.32, 2.45, 6.13, 3.65, 8.42, 5.26]
list1.remove(6.13)
print(list1)
print(list1.index(3.65))
list1.insert(3, 9.24)
print(list1)
print(list1.pop())
print(list1[1:4:2]
```

2. Define a class Item that keeps record of items available in a shop. The class contains two data members name and quantity that stores name and available quantity of an item in the shop. Define the constructor for this class to create an object with given name and quantity. Define methods update and display. The method update modifies the available quantity of the item. It the item is purchased, quantity is increased by the number of units purchased and if item is sold, quantity is decreased by the number of units sold. The method display prints the item information. 10

3. (a) Define a function insertionSort(list1) which accepts a list list1 as an input argument and sorts the list using insertion sort. 6

   (b) Illustrate the operation of the insertionSort (list1) function defined in part (a) on the following list by showing how the list would appear at the end of each iteration : 4

   [24, 35, 6, 15, 82, 49].

4. (*a*) Write a python function `searchKey(lst,k)` for searching an item `k` in the list `lst` of n integers using binary search. The function should return the index of the item `k`, if `k` is present in the list, otherwise, it should return -1.　　　　6

(*b*) Translate each of the following mathematical expressions into an equivalent Python expressions :　　　　4

(*i*) $b \quad (c \ + \ d^3) \ / \ 3$

(*ii*) $z(6+3z) \ + \ x(5-x)/y$

5. (*a*) Identify error(s), if any, in the following code segment : 2

```
def  test(a,  b):

    a[1]  =  'T'

    b[1]  =  'j'

x  =  'this'

y  =  ['m',  'n',  'o']

test(x,  y)

print(x,  y)

test(x,  y[:])

print(x,  y)
```

(b) Give the output that will be produced on execution of the following code segment :   4

```
l1 = ['P', 'Q', 'R']
l1.append('O')
print(l1)
print(l1.pop(1))
del l1[1]
print(l1)
```

(c) Give the output that will be produced on execution of the following code segment :   4

```
a = 16    # 16 in binary: 0001 0000
b = 8     # 8 in binary: 0000 1000
a = a ^ b
print(a, b)
b = b << 3
print(a, b)
a = ~b
print(a, b)
a = a & b
print(a, b)
```

6. (a) Consider a stack s of integers that is initially empty. Perform the following operations in sequence on the stack s and show the modified stack s (using a diagram) after each of the following operations : 5

    (i) push 18

    (ii) pop

    (iii) push 7

    (iv) push 5

    (v) pop.

(b) Evaluate the following expressions : 5

    (i) 2 ** 2 ** 3

    (ii) not 10 == 8 and 6+3 != 9

    (iii) 6 ** 2 // 12 % 4

    (iv) 'list' > 'List'

    (v) 12 / 6 /

7. (a) Write a Python program that takes a positive integer n (n < 9) as input from the user and produces

an n lines pattern as output. For example, when 5 is

entered as the value of n, the output will be as follows : 5

55555

4444

333

22

1

(b)   Give the output that will be produced on execution of

the following code segment :   5

```
str1= 'We   are   learning   python'

print(str1.split())

print(str1.capitalize())

print(str1.count('n'))

print(str1.swapcase())

print(str1.title())
```

8. (*a*) Write a Python function `checkVowel(ch)` that accepts a character argument `ch`. The function `checkVowel` checks whether character `ch` is a vowel. The function `checkVowel` returns true if given character `ch` is a vowel, otherwise returns false.   5

    (*b*) Write a segment of the Python code to find the sum of the n terms of the series given below. The input n is to be entered by the user at run time.   5

$$1 - 2 + 3 - 4 + 5 - 6 + \ldots + n$$