

2022-23

DATA STRUCTURE AND ALGORITHM

CSO - 441

Full Marks : 25

Time : Ninety Minutes

*The figures in the margin indicate full marks.*Answer *all* the questions.Answer the questions in the order they
appear in the question paper.

1. Consider a list LIST1 = [10, 20, 30, NIT, 40]. What will be the command to get NIT from LIST1?

(a) LIST1 [0]

(b) LIST1 [3]

(c) LIST1 [0] [3]

(d) LIST1 [4] 1 [CO, CO1]

2. What type will be printed when the following code executes?

*x=("Orange")**Print type (x)*

(a) list

(b) tuple

P.T.O.

(2)

(c) array

(d) str

1 [CO1]

3. What will the following code return?

```
def practice (tup)
```

```
    a, b, c = tup
```

```
    return a
```

```
    a Tuple = "Yellow", 20 "Red"
```

```
    practice (a Tuple)
```

(a) ("Yellow", 20, "Red")

(b) Yellow

(c) 20

(d) Red

1 [CO2]

4. Which of the following options will produce the same output?

```
tupl1 = (5, 3, 1, 9, 0)
```

(i) print (tup1[:-1]) (ii) print (tup1 [0:5]) (iii) print (tupl1 [0:4])

(iv) print (tupl1 [-4:])

(a) i, ii

(b) ii, iv

(c) i, iv

(d) i, iii

1 [CO1]

(3)

5. What will be the output of the following code snippet?

```
print (2**3+(5+6) ** (1+1))
```

(a) 129

(b) 8

(c) 21

(d) None

1 [CO1]

6. What will be the datatype of the *var* in the below code snippet?

```
var = 10
print(type(var))
var = "Hello"
print(type(var))
```

(a) int & str

(b) str & str

(c) str & int

(d) int & float

1 [CO1]

7. What will be the output of the following code snippet?

```
a=[1, 2, 3, 4, 5]
sum = 0
for ele in a :
    sum = sum + ele
print (sum)
```

(a) 15

P.T.O.

(4)

(b) 0

(c) 20

(d) None

1 [CO1]

8. Read the following code and select the output.

```
def solve (a, b):  
    if a ==0:  
        return b  
    else:  
        solve (b% a,a)  
print (solve (20, 50))
```

(a) 10

(b) 20

(c) 50

(d) 1

1 [CO2]

9. What will be the data type the variable numbers in the below code snippet?

```
numbers = [4, 7, 19, 2, 89, 45, 72, 22]  
print (type(numbers))
```

(a) List

(b) Tuple

(c) String

(d) Integer

1 [CO1]

(5)

10. Which of the following declaration(s) is/are incorrect in python language?

(a) `xyzp = 5,000,000`

(b) `x y z p = 5000 6000 7000 8000`

(c) `x,y,z,p = 5000, 6000, 7000, 8000`

(d) `x_y_z_p = 5,000,000` 1 [CO1]

11. Write a python program or pseudocode to reverse a string taken as input from the user. Count the number of vowels, digits and white spaces of a given string. 2+3 [CO1]

12. Write a Python program or pseudocode to print a dictionary where the keys are numbers between 1 and 5 (both included) and the values are the square of the keys.

Fill in the gaps of the following function to find if a year is leap year or not :

```
def (CheckLeap(Year):
```

```
    if ((_____ ) or (_____ ) and (Year%4 ==0)):
```

```
        print ("Given Year is a leap Year"):
```

```
    else:
```

```
        print ("Given Year is not leap Year")
```

What are the differences between list and tuple?

2+2+1 [CO1 & CO2]

P.T.O.

(6)

13. Write a python program or pseudocode to print the following pattern:

1 2 3 4 5

1 2 3 4

1 2 3

1 2

1

Write a python program or pseudocode to create a list with random numbers (positive and negative) and find out all negative numbers present in that list. 3+2 [CO1]

Course Outcomes :

- CO1 : Describe linear data structures using array and linked list
- CO2 : Application of linear data structure.

Q. No. CSO - 443

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DIGITAL COMPUTER DESIGN**CSO - 443**

Full Marks : 25

Time : Ninety Minutes

The figures in the margin indicate full marks.

Answer all the questions.

1. (a) Simplify the Boolean expression: $F(w, x, y, z) = \sum(1, 3, 7, 11, 15) + d(0, 2, 5)$
 (b) Simplify the Boolean expression into POS form : $F(w, x, y, z) = \sum(0, 1, 2, 5, 8, 9, 10)$. 3+3 [CO2]
2. If $(x567)_8 + (27 \times 5)_8 = (75yx)_8$, find the values of x, y. 2 [CO2]
3. Design a 4×16 decoder using 3×8 decoders 3 [CO1]
4. State and prove the Consensus Theorem in Boolean Algebra. 3 [CO2]
5. Design a 4-bit ripple carry binary adder/subtractor circuit using Full Adder blocks. 3 [CO2]
6. Design a 4-bit bidirectional Shift Register using D-flipflops. 3 [CO1]

P.T.O.

(2)

7. (a) Explain the difference between a latch and a flip-flop.
- (b) Explain the operation of a master-slave JK flip-flop with function table. 2+3 [CO1]
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Course Outcomes :

- CO1 : Design the hardware building blocks of a computer system.
- CO2 : Analyze the various parts of a modern computer functional units, bus structure, addressing modes and computer arithmetic.
- CO3 : Identify the process involved in executing an instruction and fetching the word from memory.
- CO4 : Design the hardwired and micro-programmed control units and implementation of interrupts.
- CO5 : Understand the memory hierarchy and design a memory system.