

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
THEORY EXAMINATION (Regular & Re-appear)
Question Paper

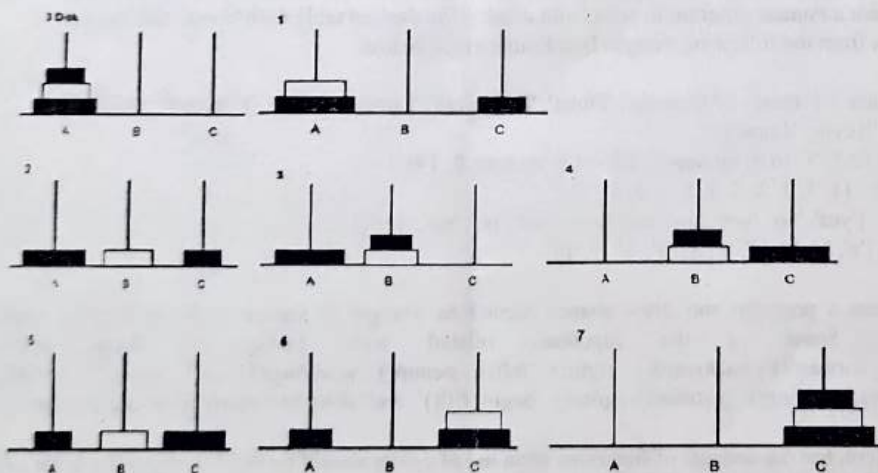
Month and year: **May-June 2022**
 Program: **B.Tech.-CO/IT**
 Subject: **Programming Using Python**
 Maximum Marks: **50**
 Number of Questions to be attempted: **5**

Total no. of pages used: **3**
 Exam Date: **25.05.2022**
 Course code: **CSPE-22/ITPE-22**
 Time allowed: **03Hours**
 Total No of Questions: **5**

Note: 1. First four questions are compulsory and a choice is given in Q:5
2. All programs must be modular, readable, efficient and should work for normal as well as exceptional Inputs. Modularity and readability must not be compromised in any program.

- Q-1.** a. Implement a function in Python named `unique_common` that accepts two lists both of which contain integers as parameters and returns a sorted list (ascending order) which contains unique common elements from both the lists. If there are no common elements between the two lists, then your function should return the keyword- `None`.
- For example, if two of the lists received by the function are:
- ```
[(5, 6, -7, 8, 8, 9, 9, 10), [2, 4, 8, 8, 5, -7)]
```
- You can see that elements 5, -7, and 8 are common in both the first list and the second list and that the common element 8 occurs twice in both lists. Now you should return a sorted list (ascending order) of unique common elements like this:
- ```
[-7, 5, 8]
```
- If the two lists received by the function are:
- ```
[(5, 6, 7, 0), [3, 2, 3, 2)]
```
- Since, there are no common elements between the two lists; your function should return the keyword `None`.
- b. Discuss list and tuple in detail along with their uses and differences with the help of an example. Also, design a program that reads an unspecified number of integers and finds the ones that have the most occurrences. For instance, if you enter 12 33 40 3 5 4 -3 3 3 2 0, the number 3 occurs most often (enter all numbers in one line). Further, If not one but several numbers have the most occurrences, all of them should be reported. For example, since 9 and 3 appear twice in the list 9 303 9 3 2 4, both occurrences should be reported.

**Q:2** a. Implement a python program for Tower of Hanoi problem:



Tower of Hanoi is a mathematical puzzle where we have three rods and  $n$  disks. The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

- Only one disk can be moved at a time.
- Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.
- No disk may be placed on the top of a smaller disk.

b. Identify the error will occur when you run the following code?

```
def main():
 print(min(min(5, 6), (51, 6)))
```

```
def min(n1, n2):
 smallest = n1
 if n2 < smallest:
 smallest = n2
```

```
main() # Call the main function
```

c. Develop a pseudo code for multiplication table of user request with iterative count defined as 10 and with the condition, instead of printing the product of each iteration, print “#” if the product value is even and print “\$” if the product value is odd, for each iteration product value.

Reference Example:  $5 * 1 = \$$   
 $5 * 2 = \#$   
 $5 * 3 = \$$

Q:3 Design a module that contains the following two functions for the Conversions between feet and meters and function headers are given below.

# Converts from feet to meters      # Converts from meters to feet

def footToMeter(foot):      def meterToFoot(meter):

Now, write a program that invokes these functions to display the following tables in the same format and conversion formulas are given in the text box.

| Feet | Meters | Meters | Feet |
|------|--------|--------|------|
|------|--------|--------|------|

|      |      |        |      |
|------|------|--------|------|
| 1.00 | 3.05 | 20.066 | 5.74 |
|------|------|--------|------|

|      |      |        |      |
|------|------|--------|------|
| 2.00 | 6.10 | 25.081 | 9.67 |
|------|------|--------|------|

...

|      |      |        |       |
|------|------|--------|-------|
| 9.02 | 7.45 | 60.019 | 6.721 |
|------|------|--------|-------|

|       |      |        |       |
|-------|------|--------|-------|
| 10.03 | 0.50 | 66.021 | 5.115 |
|-------|------|--------|-------|

The formulas for the conversion are:

foot = meter / 0.305

meter = 0.305 \* foot

Q:4 Explain the significance of numpy and pandas along with their paramount functions. Also, implement a Pandas program to select and display the desired table with 'name' and 'score' columns from the following sample DataFrame given below:

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew',
 'Laura', 'Kevin', 'Jonas'],
 'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
 'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
 'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Q:5 Implement a program and draw shapes named as triangle & square with the help of Turtle module. Some of the functions related with Turtle are listed below: turtle(), forward(), backward(), right(), left(), penup(), pendown(), up(), down(), color(), fillcolor(), heading(), position(), goto(), begin\_fill(), end\_fill(), and many more are available.

**Note:** Here, use the concept of functions and a list of colors should be there to select the color of shape randomly.

(OR)

Implement a program with the help of Tkinter and create a simple GUI with the help of buttons, labels, entry fields, widget attributes such as sizes, fonts, colors layouts, etc. The structure of application is given below:



Hel'o Python

First number

10

Second number

20

Add

Subtract

Result

30

\*\*\*\*\*THE END\*\*\*\*\*