Master of Computer Applications
MCAC-101: Object Oriented Programming
Unique Paper Code: 223401101
Semester I
December-2020 (OBE Phase-1)
Year of admission: 2019

Time: Three Hours   **Max. Marks: 70**

Note: Answer any 4 questions. All questions carry equal marks.

1. Write a Python function **countOccurrence** that takes a *string* as the input parameter and returns a dictionary **count** that shows the count of occurrence of each letter in the input *string* with key as the letter and count of occurrence as the corresponding value. Also, define another function **invert** that accepts a dictionary **dictWord** of words mapped to their meanings and returns the inverted dictionary **invDict** of meaning:list-of-words.

2. Write a recursive function that takes a list lst of numbers as input argument and returns the corresponding cumulative list **cumulativeLst** so that cumulativeLst[i] = lst[0] + lst[1]+ … + lst[i]. For example, if lst = [3, 6, 4, 8, 5], the function should return [3, 9, 13, 21, 26].

3. Write a function that reads the contents of the file **CurrentTrends.txt** comprising the text separated by blanks (assume that no other punctuation symbols are used) and counts the number of words and the number of words starting with a consonant. Handle all possible exceptions that can be raised.

4. Define a class **Date** having the attributes day, month and year. Define the appropriate constructor and __str__ functions and a method of class Date called next_date that takes a **Date** object date and returns a new **Date** object that represents the day one day after date.

5. A given list, say, lst is to be sorted using **insertionSort** algorithm. Assume that elements lst[0], lst[1], …, lst[k], have already been arranged (lst[0] being the least element of the list), write a function **insertionSort** that accepts the list lst along with other suitable parameters) to carry out the next iteration of

`insertionSort` so that on execution of the function `lst[0]`, `lst[1],…,lst[k]`, `lst[k+1]` have been arranged. For example, if `k=3`, `lst = [5, 8, 12, 13, 10, 40, 18, 35, 17, 30]` get modified to `lst = [5, 8, 10, 12, 13, 40, 18, 35, 17, 30]`. Write another function that takes two lists sorted in ascending order as input parameters and returns a third sorted list by merging these two input lists into one sorted list in a single scan of the lists.

6. State the problem of Tower of Hanoi. Write a Python function to solve the problem of Tower of Hanoi. Show the contents of the stack when the number of discs is three.