Gurudas College

Physics Hons. Practical, 2020

Paper: CC – 1 P

Full marks: 30   Time: 1 hr

Answer **<u>any one</u>** question:

1. (a) Input a two – digit positive integer (<31).
   (b) Determine all the factors of the integer.
   (c) Create an empty list A.
   (d) Incorporate the factors one by one,using append statement
   (e) Sort the list in reverse order
   (f) Print the sorted list
   (g) Find maximum, minimum and sum of this list
   (h) Print maximum, minimum and sum.
   (i) Create another list B which contains the maximum and the minimum values.
   (j) Print B.

2. Given an accuracy limit, calculate the sum of a cosine series,as given below

   $$s1 = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots \ldots \ldots \ldots \ldots ..$$

   (a) Input the angle in degree and convert it in radian to get the value of x
   (b) Input the accuracy value (= 0.00001) from outside
   (c) Determine the sum of the series (s1)
   (d) Find the number of terms necessary to get the aforesaid accuracy.
   (e) Calculate the magnitude of the following expression
   $$s2 = (s1)^2 + \sin^2 x$$

3. Construct a Fibonacci series with finite number of terms(n), using a loop statement
   (a) Input $n (10 \leq n \leq 15)$
   (b) Print the elements of the series
   (c) Calculate sum of all these numbers
   (d) Print no. of terms and the sum according to the format given below:
        No. of terms =   sum =
   (e) Create an empty list A.
   (f) Incorporate these terms one by one in A using append statement
   (g)Print A
   (h) Find the mean value of A after inserting 100 at the 2nd position.
   (i) Print the final list and corresponding mean value.

4. Find the mean, variance and standard deviation of a list of following numbers, given below:
   21, −3, 3.67, 0, 19, −23.32, 55, 14, 2.6, −13

where

$$\text{Mean} = \frac{1}{n}\sum x \; ; \quad \text{Variance} = \frac{1}{n}\sum x^2 - \left(\frac{1}{n}\sum x\right)^2 ; \quad \text{Standard deviation} = \sqrt{\text{Variance}}$$

   (a) Create an empty list A
   (b) Incorporate the numbers one by one in A, using append statement
   (c) Find mean, variance and standard deviation using loop statement
   (d) Print the outputs of above items in the following manner:
   Mean =
   Variance =
   Standard deviation =

5. Using 'Binary Search' method, find whether the number −19 exists in the following list:
   24, 3, 100, −4, 16, 91, −19, 13, 120

   (a) Create an empty list A
   (b) Input elements one by one
   (c) Incorporate them in A (using append statement)
   (d) Sort the list
   (e) Apply binary search method on the sorted list and find whether −19 exists in the list
   (f) Get the position of the number.
   (g) Print the sorted list and the index of −19.

6. Find the roots of following three quadratic equations and indicate type of roots in each case.
   (i) $3x^2 + 6x + 3 = 0$; (ii) $4x^2 + 8x + 3 = 0$ and (iii) $4x^2 + 6x + 3 = 0$

   (a) Input coefficients of equations from outside
   (b) Print the output in the following manner:

   Eqn. No. =   Type of roots

   R1 =   R2 =