Physics (Honours) Practical Examination 2021

Semester 1
Paper: PHS-A-CC-1-1-P
Topic: Mathematical Physics 1 (Practical)
Full Marks: 30

Write all codes and algorithms on paper only. There is no need to attach any computer-generated outputs or plots.

Answer any two questions.

1. Create an empty array in a python script. Store ten positive numbers in the array. Print the array. Print the sum and average of the numbers. Sort the numbers in ascending order using bubble sort method. Find the smallest and largest number. [Program: 12, Algorithm: 3]

2. Read two matrices inside a python script. Check if the number of rows and columns are equal or not. Enter the elements of the matrices containing both positive and negative numbers. Add and subtract the matrices. Print the four matrices. [Program: 12, Algorithm: 3]

3. (i) Set a function, $f(x) = x^3 - 4x^2 - 8$. Set the range of x-values from -10 to $+15$ and the range of y-values [y is treated as $f(x)$] from -2000 to $+2500$. Plot this function in the given range. Both the x and the y-axes must be drawn on the graph. The x-label will be "x value" and the y-label will be "my function". (ii) Plot $\sinh(x), \cosh(x)$ and $\tanh(x)$ on the same graph. The line width of the curves will be gradually increasing, i.e., the line width of $\cosh(x)$ will be thicker than that of $\sinh(x)$ and the line width of $\tanh(x)$ will be thicker than that of $\cosh(x)$. Set the range of x-values from -6 to $+6$ and the range of y-values from -8 to $+8$. The x-label will be "x values" and that of the y-axis will be "hyperbolic functions". [7+8]

*Answer scripts must be emailed to **sem1hcityphysics@gmail.com** within 15 minutes of the end of the examination.*