# Vidyavardhini's College of Engineering and Technology, Vasai (West)

## First Year Engineering

## Academic Year: 2024-2025

## Problem Set 1: Measurement and Statistics

**Subject: BSC2023/EP** **Date: 31/01/2025**
**Max Marks: 10** **Submission Deadline: 07-02-2025**

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**CO1:** To provide students with a basic understanding of measurements in the field of basic engineering.

| Q. No. | Questions | Marks | CO | CL |
|---|---|---|---|---|
| 1 | (a) A quality control team collects the following data of defective items in 5 production batches: $3, 7, 2, 8, 5$. Calculate the sample mean. If a $6^{\text{th}}$ batch is added with 10 defective items, calculate the new sample mean.<br>(b) A researcher measures the heights of 6 plants in cm: $48, 52, 49, 51, 50, 53$. Calculate the sample mean. Determine the sample standard deviation. | 4 | 1 | 3 |
| 2 | (a) A small population of $N = 8$ students scored the following marks in a physics test: $75, 80, 82, 70, 85, 90, 88, 76$. Calculate the population mean. If a new student scores 92, recalculate the population mean.<br>(b) The weights in kg of a population of 6 individuals are $58, 60, 62, 64, 66, 68$. Calculate the population mean. Determine the population standard deviation. | 4 | 1 | 3 |
| 3 | A researcher measures the following data:<br>$(x_1, y_1) = (1, 3)$, $(x_2, y_2) = (2, 5)$, $(x_3, y_3) = (3, 7)$, $(x_4, y_4) = (4, 10)$<br>Find the equation of the best-fit line $y = mx + c$ using the least squares method. | 2 | 1 | 3 |

*NB: I think it is much more interesting to live with uncertainty than to live with answers that might be wrong.* *– Richard Philliphs Feynman*