**[QUE-1] - What do you mean by Measure of Central Tendency and Measures of Dispersion. How it can be calculated.**

**Measures of Central Tendency:**

Measures of central tendency are statistical measures that describe where the center of a distribution of data lies. They provide a single value that represents the central point or typical value of a dataset. The three main measures of central tendency are:

1. **Mean:** The arithmetic average of a set of values. It is calculated by summing all values and dividing by the number of values n.

Mean=n∑i=1n Xi

1. **Median:** The middle value in a sorted, ascending or descending, list of numbers. If there is an odd number of data points, it's the middle value; if even, it's the average of the two middle values.
2. **Mode:** The value that appears most frequently in a dataset. A dataset may have one mode (unimodal), more than one mode (multimodal), or no mode at all.

**Measures of Dispersion:**

Measures of dispersion quantify the spread or variability of a dataset. They indicate how much the values in a dataset differ from the central tendency measures. The commonly used measures of dispersion include:

1. **Range:** The difference between the maximum and minimum values in a dataset.

Range=Max(X)−Min(X)

1. **Variance:** The average of the squared differences from the mean. It gives a measure of how spread out the data points are around the mean.

Variance=n∑i=1n (Xi −Xˉ)2

Where Xˉ is the mean of the dataset.

1. **Standard Deviation:** The square root of the variance. It provides a measure of the amount of variation or dispersion of a set of values.

Standard Deviation=Variance

1. **Interquartile Range (IQR):** The range of the middle 50% of the data. It is calculated as the difference between the third quartile (Q3) and the first quartile (Q1).

IQR=Q3−Q1

Where Q1 is the 25th percentile and Q3 is the 75th percentile of the dataset.

### **How They Can Be Calculated:**

* **Mean:** Calculate the sum of all values and divide by the number of values.
* **Median:** Arrange the values in ascending order and find the middle value. If there's an even number of values, take the average of the two middle values.
* **Mode:** Identify the value(s) that occur most frequently in the dataset.
* **Range:** Subtract the smallest value from the largest value in the dataset.
* **Variance:** Calculate the average of the squared differences between each value and the mean.
* **Standard Deviation:** Take the square root of the variance.
* **Interquartile Range (IQR):** Calculate the difference between the third quartile (Q3) and the first quartile (Q1).