PART B

Control Charts for Attributes

CONTROL CHARTS FOR ATTRIBUTES

The second part of this lab course comprises Sessions 6 to 10 which will enable you to develop practical skills for constructing control charts for attributes in MS Excel 2007. In lab sessions of Part A, you have learnt how to construct control charts for variables. These charts are for quality characteristics that can be measured and expressed numerically. For example, diameter, length, weight, position, thickness, etc. You have constructed control charts for mean, range and standard deviation.

In Unit 3 of MSTE-001 (Industrial Statistics-I), you have learnt that a separate variable chart is required for each quality characteristic. However, if a manufacturer specifies more than one (say, 10) measurable quality characteristics for its product, it becomes impracticable and uneconomical to construct 10 control charts. In such situations, we use control charts for attributes, which provide overall information about the quality of the product. There are many situations in which numerical measurement is not possible, e.g., the number of failures in a production run, number of defects in a laptop, mobile, furniture, fabric, etc. In such situations, we classify the items into one of the two classes: conforming or non conforming, defective or non-defective, good or bad, etc.

In such cases, actual measurements are not taken. Instead, the number of **defectives** or **defects** are **counted**. The size of the defect and its location are not important. The products are inspected and either accepted or rejected.

You have also learnt in Units 3 and 4 of MSTE-001 that we construct control charts for attributes for controlling the defectives and defects. The following control charts for attributes are used most frequently in quality control:

1. Control charts for defectives (p-chart and np-chart)
2. Control chart for defects (c-chart and u-chart)

The control charts for defectives are based on the **binomial** distribution. The control charts for defects are based on the **Poisson** distribution. The control charts for attributes are shown in Fig. B.1.

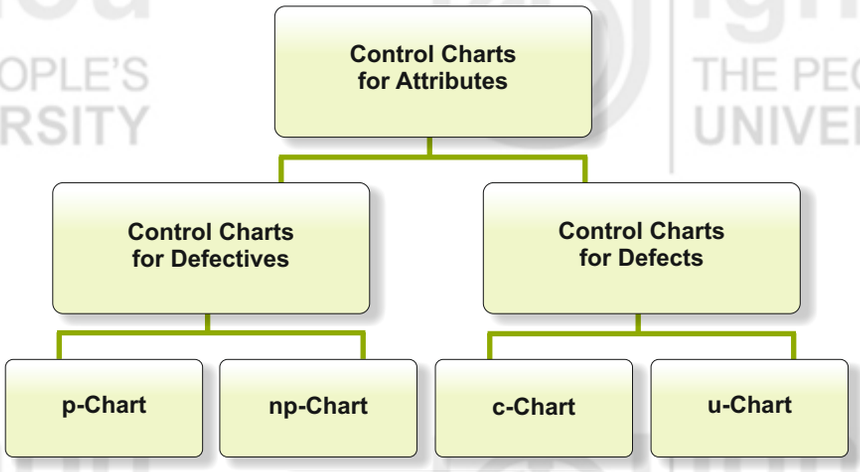

Fig. B.1

In Sessions 6 and 7, you will learn how to prepare the p-chart for **fraction defective** for both **constant** and **variable sample sizes**, respectively. It is applied to quality characteristics, which are not measurable and the items or units are classified as defective or non-defective. Session 8 deals with construction of the np-chart for the **number of defectives**.

In Session 9, you will learn how to construct the c-chart used to monitor and control the **number of defects**. In Session 10, we demonstrate the construction of u-chart to control the **number of defects per unit**.

All sessions of this part have been designed in such a way that after successfully completing them, you will be able to construct different control charts for attributes using MS Excel 2007. You will also be able to use suitable attribute control charts for any given data.

Before studying the lab sessions of Part B, we expect that you have studied Units 3 and 4 of the course MSTE-001 entitled Industrial Statistics-I thoroughly. All concepts and formulae used there will be applied here.