ROHINI

COLLEGE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF MECHANICAL ENGINEERING

24ME403 - METROLOGY & MEASUREMENTS

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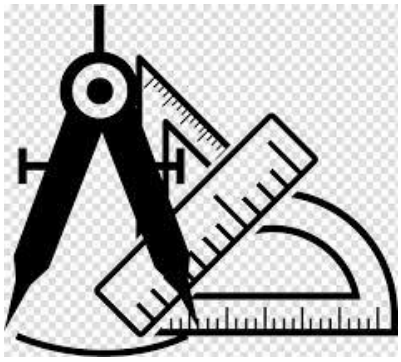

UNIT III – TOLERANCE ANALYSIS

1) Explain the concept of interchangeability applied to industries.

Interchangeability:

* Interchangeability is a key concept in manufacturing and production that refers to replace one part or component with another identical part without affecting the functionality, performance, or assembly of a product.

* In other words, interchangeable parts are manufactured within specific tolerances, ensuring that they are functionally equivalent and can be swapped without any need for rework or adjustments.

Interchangeability in Industries:

i) Standardization of parts:

* Interchangeability is made possible through the standardization of part sizes, materials and manufacturing processes.

* This ensures that components can be produced in large quantities and replaced easily.

ii) Dimensional Tolerances:

* Parts are designed and manufactured with specific dimensional tolerances that define the allowable limits of variation from the ideal size.

* These tolerances are critical to ensuring that parts fit and function together properly.

iii) Mass Production Efficiency:

* Interchangeability is particularly important in mass production, as it reduces the need for custom fitting or modification of parts, leading to higher efficiency, reduced costs, and faster assembly times.

iv) Quality control:

* To achieve interchangeability, strict quality control measures are implemented to ensure that all parts within a batch meet the required specifications.

v) Applications:

* Interchangeability is commonly applied in industries such as automative manufacturing, aerospace, electronics, and consumer goods.

* Example: sparks plugs, tires, engines, etc.,