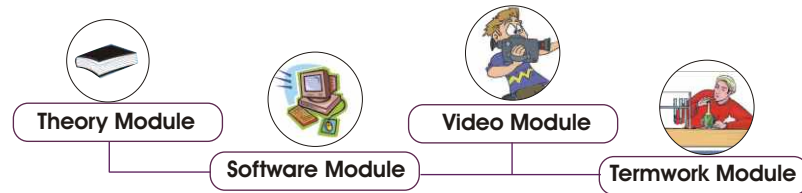


Metrology and Quality Control



Introduces, Global e-Learning System in Education & Training in the form of Learning Resources with Computer Aided Instructions



System Requirement:- IBM-PC Compatible Min P-III with Window-OS, 128 MB RAM/Multimedia Kit

Theory module

Features : Theory, Figures, Photographs, Animations with controller, Highlighter tool, Note creation Facility, Systematic page navigation, Printing facility Access to Videos at appropriate locations.

List of Topics

Introduction

- ✍ What is metrology?
- ✍ Need of inspection
- ✍ Mechanical measurements
- ✍ Measurement categories
- ✍ General measurement scheme
- ✍ Errors in measurements
- ✍ Error distribution
- ✍ Standard deviation of the means
- ✍ Physical interpretation
- ✍ Goodness of fit and the index of correlation
- ✍ General non-linear fit
- ✍ Full factorial design



Linear Measurements



- ✍ Line graduated measuring instruments
- ✍ Steel rule
- ✍ Principle of flat surface generation
- ✍ Testing flatness of surface plate
- ✍ Angle plate
- ✍ V-block
- ✍ Bench centers
- ✍ Straight edges
- ✍ Types of venire calipers
- ✍ Errors in calipers
- ✍ Micrometers

Limits, Fits and Gauges

- ✍ Specifying tolerances for given assemblies
- ✍ Interchangeability
- ✍ Limits
- ✍ Tolerances
- ✍ Allowances
- ✍ Fits
- ✍ Fundamental deviation
- ✍ Shaft
- ✍ Hole
- ✍ Basic shaft
- ✍ Basic hole
- ✍ Plain plug gauges
- ✍ Snap gauges
- ✍ Combined limit gauge
- ✍ Wear allowance consideration on Gauge maker's tolerance



Comparators



- ✍ Introduction
- ✍ Mechanical comparators
- ✍ Optical comparators
- ✍ Electrical comparators
- ✍ Pneumatic comparators
- ✍ The Johansson mikrokater
- ✍ The sigma comparator
- ✍ Mechanical optical comparators

Measurement by Light-wave interference

- ✍ Interference of two rays
- ✍ Checking the flatness by above method
- ✍ Surface contour test
- ✍ Testing the parallelism of any surface



Straightness, flatness, square ness, parallelism, circulatory & rotation

- ✍ Straightness
- ✍ Straight edge
- ✍ Flatness testing
- ✍ Parallelism, equidistance and coincidence
- ✍ Parallelism of an axis to a plane
- ✍ Parallelism between two straight lines
- ✍ Parallelism between two trajectories
- ✍ Equidistance
- ✍ Coincidence or alignment
- ✍ Square ness
- ✍ Squareness of an axis of rotation with a given plane

Angular measurement & circular division

- ✍ Vernier and optical bevel protractor
- ✍ Universal bevel protractor
- ✍ Bevel protractors as per Indian standard practice
- ✍ Use of bevel protractor
- ✍ Optical dividing head
- ✍ Sine principle and sine bars
- ✍ Use of sine bar
- ✍ Sine centre
- ✍ Angle gauges
- ✍ Uses of Angle gauges
- ✍ Principle of the autocollimator
- ✍ Angle dekkor
- ✍ Measuring angle of a component



Heat flux measurement

- ✍ Measurement of Heat flux
- ✍ Foil type heat flux gage
- ✍ Thin film sensors
- ✍ Cooled thin wafer heat flux gage
- ✍ Axial conduction guarded probe
- ✍ Slug type sensor
- ✍ Response of a slug type sensor with a small heat loss



Temperature measurements

- ✍ Principle of thermometer
- ✍ Constant volume gas thermometer
- ✍ Practical thermometry
- ✍ How do we make thermometer?
- ✍ Thermoelectric thermometer
- ✍ Electric resistance
- ✍ Thermal expansion
- ✍ Kelvin relations
- ✍ Resistance thermometry
- ✍ RTD measurement circuits.
- ✍ Brightness temperature
- ✍ Measurement of transient temperature
- ✍ Measurement of temperature
- ✍ Conduction error in thermocouple temperature measurement
- ✍ Measurement of temperature within a solid



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