

# **AMTD20 METROLOGY & QUALITY CONTROL**

## **UNIT-1 MEASUREMENTS**

International standards of length-Line and end measurement, Need of measurement, possible errors in measurement, slip gauges.

## **UNIT-2 TOLERANCES AND GAUGING**

Unilateral and bilateral tolerances, Limits, Fits, Types of Fits, IS specifications of limits. Importance of limits, System in mass production, limit gauges used for plain and taper works.

## **UNIT-3 MAGNIFICATION**

Principles and characteristics of measuring instruments, Mechanical, Optical, electrical, Pneumatic method of magnification, different types of Vernier's, Micrometers, Dial gauges, Mechanical and pneumatic, Types of comparators. Use of comparators in inspection.

## **UNIT-4 MEASUREMENT OF ANGLES, TAPERS AND RADIUS**

Bevel Protractor, Spirit level, Clinometers, angle Decker, standard balls and rollers for angle measurement, angle slip gauges, and radius measurement of circular portion, measurement of concave and convex surface radius.

## **UNIT-5 INTERFEROMETRY**

Principle of Interferometry and application in checking of flatness, angle and height.

## **UNIT-6 STRAIGHTNESS AND FLATNESS:**

Straight edge, use of level beam comparator, autocollimator testing of flatness of surface plate (Theoretical treatment only)

## **UNIT-7 SURFACE FINISH**

Types of textures obtained during machine operation, range of C.L.A. value in different operations in numerical assessment of surface finish (B.I.S. Specifications of C.L.A. value)-sample length of different machining operations. Direction of lay, texture, symbols, instruments used in surface finish assessment.

## **UNIT-8 MEASUREMENT OF EXTERNAL THREADS**

Different errors in screw threads, measurement of forms of thread with profile projector, pitch measurement, measurement of thread diameter with standard wire, screw thread micrometer.

## **UNIT-9 MEASUREMENT OF SPUR GEARS**

Run out checking, Pitch measurement, profile checking, backlash checking, tooth thickness measurement, alignment checking, errors in gears, checking of composite errors.

## **UNIT-10 QUALITY CONTROL**

A) Concept of Quality and quality control, elements of quality and its growth, purpose, setup, policy and objective, factors controlling and quality of design and conformance, balance between cost and quality and value of quality. Specification of quality, planning through trial lots and for essential information.

B) Introduction to topic such as in process quality, quality circles, quality management, total quality control, ISO 9000 and equivalent Indian standards.

#### **UNIT-11 STATISTICAL QUALITY CONTROL-**

Importance of statistical method in quality control, measuring of statistical control variables and attributes. Measurement/inspection, different types of control charts (X Bars, R, P. charts) and their constructions and their application.

#### **UNIT-12 ACCEPTANCE SAMPLING**

Sampling inspection and percentage inspection, basic concept of sampling inspection, operating characteristic curves, conflicting interests of consumer and producer, producer and consumers risks, AWQL, LTPD, ADGL, single and double sampling plans.

#### **UNIT-13 RECENT TRENDS IN QUALITY CONTROL**

1) CAQC 2) Six Sigma 3) Zero defect 4) T.Q.M. 5) T.Q.C. 6) Non-contact inspection 7) Q.F.D. 8) C.M.M. 9) QUIZEN 10) D.O.P

#### **Reference Books:**

1. Metrology And Quality Control by Dr A M Badadhe S G Shilwant and Dr B Anand
2. Metrology and Quality Control by Paras A Palsatkar
3. Decode Metrology and Quality Control for SPPU by Decode