**DEPARTMENT OF MECHANICAL ENGINEERING**

**PART-B IMPORTANT QUESTIONS**

**SUBJECT:ME6504-METROLOGY&MEASUREMENTS YEAR/SEMESTER:III/V**

## UNIT I- BASICS OF METROLOGY

1. Draw the block diagram of generalized measurement system & explain in detail.
2. Write short notes on measurement process. Explain the significance & need for measurement.
3. Explain the classification of various measuring methods.
4. Explain in detail Units & Standards.
5. Briefly explain the different types of various measuring instruments.
6. Write short notes on accuracy & precision and explain how they can be specified?
7. List out the differences between accuracy & precision with an example.
8. Explain in detail the different types of errors , their causes and how they can be eliminated.
9. Enumerate the desirable characteristics of precision measuring instruments.
10. Write short notes on the following with example for each
    a. Stability
    b. Reporting results.
    c. Uncertainity
    d. Sensitivity

## UNIT II LINEAR & ANGULAR MEASUREMENTS

1. What is a comparator?Discuss the different types of comparator and its applications.
2. Explain the construction & working principle of auto-collimator with neat sketch.
3. Explain the construction & working principle of angle dekkor with neat sketch.
4. Explain the different types of Limit gauges with neat sketch
5. Explain the various applications of limit gauges with neat sketch.
6. Explain the different types of bevel protractor with neat diagram.
7. Explain how slip gauges are checked for quality?
8. Explain any 4 different types of micrometer with neat sketch.
9. Explain the construction & working principle of pneumatic comparator with neat sketch.
10. Explain the construction & working principle of optical , electrical & electronic comparator with neat sketch.

## UNIT III- ADVANCES IN METROLOGY

1. Explain the construction & working principle of laser telemetric system with neat sketch.
2. Explain the construction & working principle of scanning laser gauge with neat sketch.
3. With neat sketch , explain the working principle of AC laser interferometer.
4. Explain the working principle of dual frequency laser interferometer & Michelson interferometer.
5. Discuss the needs , types and constructional features of CMM.
6. Write short notes on the applications of CMM
7. List out the various advantages & disadvantages of the CMM.
8. Explain the different stages of machine vision system & list out its applications.
9. Explain the features & causes of errors in CMM
10. Explain the construction & working principle of Computer controlled CMM.

## UNIT IV- FORM MEASUREMENT

1. Explain the step by step procedure for measuring the flatness of given surface with neat sketch.
2. Explain with suitable sketches the procedure for measuring the straightness of a surface by using spirit level & autocollimator.
3. Derive the expression for effective diameter of a screw thread by using 2-wire & 3-wire method.
4. Explain the methods of major & minor diameter measurement of a screw thread.
5. Write short notes on various screw thread errors & errors in gear.
6. Explain the construction & working principle of tool makers microscope with neat sketch.
7. Explain the various roundness measuring methods (devices) with neat sketches.
8. Explain the various roundness measuring machines with neat sketches.
9. Explain the construction & working principle of the following with neat sketch.
    a. Stylus probe instrument
    b. Tomlinson surfacemeter
    c. Profilometer
    d. Taylor-Bobson-Talsurf
10. Derive the expression for the tooth thickness measurement of gear by the following methods.
    a. Chordal thickness method (Gear tooth Vernier caliper)
    b. Constant chord method.
    c. Base tangent method.

## UNIT-V MEASUREMENT OF POWER , FLOW & TEMPERATURE

1. Explain the construction & working principle of orificemeter & venturimeter with neat sketch.Mention its advantages & disadvantages.
2. Explain the working principle of rotameter (variable area meters) & pitot tube with neat sketch.Mention its advantages & disadvantages.
3. Explain the working principle of hotwire anemometer with neat diagram and also mention its advantages & disadvantages.
4. Explain the working principle of bimetallic strip with neat sketch.
5. Explain the temperature measurement using thermocouples & thermopiles with neat sketch.
6. Explain the construction & working principle of electrical resistance thermometer (or) electrical thermal resistance method.
7. Explain the working principle of fluid expansion thermometer & thermistors used in the temperature measurement.
8. Write short notes on Calibration , Reliability , Readability & Reproducibility.
9. Explain the following different types of pyrometers used in temperature measurement.
    a. Total radiation pyrometer
    b. Optical pyrometer
    c. Infrared pyrometer