**DEPARTMENT OF MECHANICAL ENGINEERING**

**ME2304 ENGINEERING METROLOGY AND MEASUREMENT**

**QUESTION BANK**

**Unit-1 Concept of Measurement**

**Part-A**

1. What is measurement? Give its types.
2. State the difference between primary and secondary transducers.
3. Define the term ‘sensitivity’.
4. Define ‘precision’ and ‘accuracy’.
5. What is hysteresis?
6. Define systematic errors.
7. Define calibration.
8. Define the term error and correction.
9. What is meant by nominal size and tolerance?
10. Define readability.
11. What is relative error?
12. Define over damped and under damped system.
13. Give classification of measuring instruments.
14. Define Measurand.
15. Differentiate between sensitivity and range with suitable example.
16. What is Resolution:
17. Differentiate accuracy and Uncertainty with example.
18. Define Span:
19. What are the applications of Legal metrology ?
20. What are the important elements of measurments?

**Part-B**

1. Give the structure of generalized measuring system and explain.
2. With suitable example, explain the difference between precision and accuracy.
3. Distinguish between and give appropriate examples in each case:
4. Repeatability and reproducibility.
5. Systematic and random errors.
6. Static and dynamic response.
7. Describe the different types of errors in measurement and their causes.
8. Write a short note on:
9. Calibration.
10. Uncertainty
11. Reporting results.
12. Explain with examples the difference between a Primary and a secondary standard. What are working standards?
13. Explain the following terms in precision measurements
14. Repeatability
15. Sensitivity
16. Lag
17. Derived unit.
18. Explain the sources of error.
19. Define accuracy. Explain how the accuracy of an instrument can be specified.
20. Briefly explain the various types of input signal.

**Unit-2 Linear and Angular Measurement**

**Part-A**

1. Why laser is preferred in Engineering Metrology?
2. What is laser micrometer?
3. What is wringing of gauge blocks?
4. What is the advantage of using laser beam in interferometry?
5. State “Taylor’s principle of gauge design”.
6. What is a comparator?
7. Classify the comparator according to the principles used for obtaining magnification.
8. What is the principle of working of pneumatic comparator?
9. State any two limitations of sine bar.
10. What is the constructional difference between an auto-collimator and an angle dekkor?
11. What will happen if the gauge blocks are just simply placed one over another and measurements are made?
12. What are sine centers?
13. A 250mm sine bar is set to be an angle of 350 5’6’’. Find the height of the gauge blocks required using any appropriate set of gauge blocks.
14. State the principle of interferometry.
15. What are the advantages of pneumatic comparator?
16. List out the types of micrometer.
17. What are slip gauge accessories?
18. State the uses of sine bar.
19. What are the different types of bevel protractors?
20. List out the uses of angle dekkor.

**Part B**

1. State the main requirements of slip gauges. How are slip gauges manufactured?
2. Describe the Constructional details of an Angle Decker and explain how it is used to measure the angle.
3. Explain how flatness errors of lapped surface are measured with an optical flat.
4. Explain how the measuring head sensitivity, pneumatic sensitivity and overall Sensitivity vary with variation of diameter of measurement orifice.
5. Explain the working principle of laser micrometer.
6. Describe with the help of a neat diagram of vernier bevel protractor.
7. Explain the working principle of
8. Mechanical comparator

 (ii) Electrical comparator

1. Explain pneumatic comparator and also list advantages and disadvantages.
2. Explain with the help of neat sketch, the principle and construction of an auto-collimator.
3. Explain taper measurement using angle gauges and rollers.