LUKHDHIRJI ENGINEERING COLLEGE Morbi

MECHANICAL ENGINEERING DEPARTMENT

Subject Name: Mechanical Measurement & Metrology (3141901) Semester: 4th

ASSIGNMENT – 1 Basics of measurement & metrology CO1

1. Illustrate diagram, explain the generalized measurement system.
2. Define following terms: a) Accuracy b) Linearity c) Limits d) Precision e) Fidelity f) Interchangeability g) Hysteresis h) Calibration i) repeatability j) resolution k) Maximum metal limit l) Upper and lower deviation m) allowance
3. Why hole basis system is generally preferred? Explain.
4. Enlist the possible sources of errors in measurements? Briefly explain them.
5. Discuss any two important uses of an autocollimator in the industry.
6. What is the maximum recommended angle to which a sine bar can be set? Discuss the relationship between the angle being set and the error of measurement for a sine bar.
7. Explain the construction and working of LVDT with its advantage and disadvantages.
8. Define fit. Describe various types of fits.
9. Explain the difference between accuracy and precision with neat sketch.
10. Enlist different types of comparators. Explain any one of them with neat sketch.
11. Define Tolerance. Why Tolerance provided during design of product?
12. Enlist different Linear and Angular measuring instruments.
13. Give comparison of Line standard vs End standards.
14. Explain the characteristics of good comparator.

ASSIGNMENT – 2 Force/Torque/Power/Temperature measurement CO2

1. Illustrate with a schematic diagram, explain the working of a prony brake dynamometers.
2. Explain the working of following: a. Pirani gauge. b. McLeod gauge
3. What is a gauge factor? Explain its importance.
4. Compare advantages of thermocouple and thermistors.
5. Illustrate with a neat sketch, explain the working of a dead-weight pressure gauge tester.
6. List the different applications of a total radiation pyrometer.
7. State the different laws of thermocouple
8. Explain the principle of electrical Strain gauges.
9. A platinum resistance thermometer has a resistance of 100 Ω at 25°C. Find it's resistance at 65°C if the temperature co-efficient of platinum is 0.0039 C-1. If the thermometer has a resistance of 150 Ω, calculate the temperature.
10. Explain hydraulic load cell.
11. With a neat sketch explain the construction and working of bourdon tube pressure gauge.

ASSIGNMENT –3 Gear and screw thread measurement CO3

1. Derive an expression for three wire method of measuring effective diameter of screw thread.
2. What is an effective diameter of threads? State its significance. Explain with sketch measurement of effective diameter by two wire method stating limitation.
3. Discuss the important applications of a tool maker's microscope.
4. Which elements of a spur gear require inspection? Name at least one instrument that is used for measuring each of these elements.
5. Write a note on the Parkinson gear tester.
6. Why inspection of gear tooth elements is required
7. Define (i) Circular Pitch (ii) Module (iii) Pressure Angle (iv) addendum
8. With the help of a neat sketch derive an equation for measuring gear tooth thickness using constant chord method. State its advantages.

ASSIGNMENT –4 Advances in metrology CO4

1. How the lasers are used in metrology? Explain any one laser technique used in metrology.
2. Illustrate with neat sketch explain working of laser interferometer.
3. State the advantages and applications of co-ordinate measuring machines.
4. Discuss the major applications of CMMs
5. Mention any three advantages of electrical intermediate modifying devices.
6. Describe the construction and working of Tool maker's microscope.
7. List the different performance characteristics of the instruments.