

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2021****Subject Code:3141901****Date:03/09/2021****Subject Name:Mechanical Measurement and Metrology****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Discuss the elements of screw thread with a neat sketch. **03**  
(b) Explain Accuracy and Precision with an example. **04**  
(c) Define absorption dynamometer. With a neat sketch explain the working of Rope Brake dynamometer. **07**

- Q.2** (a) What are the various possible sources of error in measurements? **03**  
(b) Briefly explain the following terms (i) Calibration (ii) Hysteresis (iii) Over-shoot and (iv) Dead Zone. **04**  
(c) Explain the use of sine bar with a neat sketch, also write advantages and limitations of sine bar. **07**

**OR**

- (c) Write a short note on Coordinate Measuring Machines. **07**

- Q.3** (a) Differentiate between line and end standards. **03**  
(b) Define fit and with the help of neat sketches, explain the different types of fits. **04**  
(c) Describe the construction and working of a sigma comparator. Discuss its advantages and disadvantages. **07**

**OR**

- Q.3** (a) Explain why hole basis system is generally preferred. **03**  
(b) Define unilateral and bilateral tolerances. Give examples for each. **04**  
(c) What is an LVDT? Explain its working principle with a neat sketch. **07**

- Q.4** (a) Define (i) Circular Pitch (ii) Module and (iii) Pressure Angle. **03**  
(b) Explain Parkinson gear tester with a neat sketch. **04**  
(c) Explain three wire method for measuring effective diameter of a thread. State its advantages over two wire method. **07**

**OR**

- Q.4** (a) What is a comparator? Give its classification. **03**  
(b) Derive the expression for best wire size for the measurement of effective diameter of a screw thread. **04**  
(c) With the help of a neat sketch derive an equation for measuring gear tooth thickness using constant chord method. State its advantages. **07**

- Q.5** (a) Explain the principle of thermocouple. **03**  
(b) Classify resistance strain gauge and explain any two. **04**  
(c) With a neat sketch explain the construction and working of bourdon tube pressure gauge. **07**

**OR**

- Q.5** (a) How are temperature measuring instruments classified? **03**  
(b) Explain the working principle of Proving Ring. **04**  
(c) Explain the construction and working principle of optical pyrometer along with its advantages and disadvantages. **07**