

GUJARAT TECHNOLOGICAL UNIVERSITY

DI -4 SEMESTER – OLD PAPER – S23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Measurements and Metrology (4341902)

Unit 1: Linear and Angular Measurement

Repeated Questions:

1. **Explain the working principle of a sine bar with a neat sketch.**
 - Appeared in: W23 (Q1b, 04 marks), SUM24 (Q1c(OR), 07 marks), SUM25 (Q1c(OR), 07 marks)
2. **Show the following readings on a Vernier Caliper/Micrometer.**
 - Appeared in: W23 (Q1c, 07 marks), SUM23 (Q1c, 07 marks), W24 (Q1c, 07 marks), SUM24 (Q2b, 04 marks), SUM25 (Q1b, 04 marks)
3. **Explain the construction and working of a simple Micrometer with a neat sketch.**
 - Appeared in: W24 (Q2b, 04 marks), SUM25 (Q1c, 07 marks)
4. **Explain the construction and working of a simple Vernier Caliper with a neat sketch.**
 - Appeared in: SUM23 (Q1b, 04 marks)
5. **A Set of slip gauges is having following slips. By selecting a proper combination of slips, make a) [Given Dimension] b) [Given Dimension].**
 - Appeared in: W24 (Q1c(OR), 07 marks), SUM23 (Q1c(OR), 07 marks), SUM25 (Q2a(OR), 03 marks)

Other Important Questions:

1. **List factors affecting measurement.**
 - W23 (Q1a, 03 marks)
2. **Write the least count of (1) Vernier caliper (2) Micrometer (3) Bevel protector.**
 - W24 (Q1a, 03 marks)
3. **Explain the difference between Accuracy and Precision.**
 - W24 (Q1b, 04 marks)
4. **Define: (1) Sensitivity (2) Accuracy (3) Precision.**
 - SUM25 (Q1a, 03 marks)
5. **Define. (1) Range (2) Least Count (3) Wringing process.**
 - SUM23 (Q2a, 03 marks)
6. **Define the following terms: a) Accuracy b) Linearity c) Least Count.**
 - SUM24 (Q1a, 03 marks)
7. **Discuss Elements of a Measuring system and Explain factors affecting Measurement.**
 - SUM24 (Q1c, 07 marks)
8. **Define standard and list types of length standard.**
 - SUM25 (Q2a, 03 marks)
9. **Explain the working principle of an Auto-collimator with a neat sketch.**
 - SUM25 (Q2b, 04 marks)
10. **Define wringing process of a slip gauge.**
 - SUM24 (Q2a, 03 marks)
11. **State the application of slip gauges.**

- SUM24 (Q2a(OR), 03 marks)
- 12. **Draw a neat sketch of a Bevel Protector and describe its construction and working.**
 - SUM24 (Q2b, 04 marks)
- 13. **Explain the working principle and least count of a mechanical bevel protector with a neat sketch.**
 - SUM25 (Q2b(OR), 04 marks)
- 14. **Write a short note on a dial indicator with a neat sketch.**
 - SUM24 (Q2c, 07 marks)

Unit 2: Measurement of Geometrical Tolerances

Repeated Questions:

1. **Explain the wedge method for the measurement of straightness with a neat sketch.**
 - **Appeared in:** SUM23 (Q5b, 04 marks), W23 (Q2b(OR), 04 marks)
2. **Explain Tomlinson surface meter / tester with a neat sketch.**
 - **Appeared in:** W24 (Q3c, 07 marks), SUM24 (Q3b(OR), 04 marks), W23 (Q2c(OR), 07 marks)
3. **Explain the V-block and dial indicator method for roundness testing with a neat sketch.**
 - **Appeared in:** SUM24 (Q2c, 07 marks)
4. **Define the following: (1) Straightness (2) Flatness (3) Roundness.**
 - **Appeared in:** W24 (Q3a(OR), 03 marks), SUM25 (Q4a, 03 marks)

Other Important Questions:

1. **List testing methods of Flatness and explain any one.**
 - W24 (Q3b, 04 marks)
2. **List testing methods of Roundness and explain any one.**
 - W24 (Q3b(OR), 04 marks)
3. **List the various straightness testing methods and explain the wedge method.**
 - SUM25 (Q4c, 07 marks)
4. **Differentiate between - Roughness and Waviness.**
 - SUM24 (Q3a, 03 marks)
5. **Define the following Terms: a) Straightness b) Roundness c) C.L.A. d) Roughness.**
 - SUM24 (Q3b, 04 marks)
6. **Demonstrate any one straightness testing method.**
 - SUM24 (Q3a(OR), 03 marks)
7. **Define: (1) Squareness (2) Roundness (3) Flatness.**
 - SUM25 (Q4a(OR), 03 marks)
8. **Define. (1) R.M.S value (2) C.L.A. value (3) Waviness (4) Lay.**
 - SUM25 (Q4b(OR), 04 marks)

9. Explain the working principle of a Profilograph.

- SUM25 (Q4a(OR), 03 marks)

10. Draw a neat sketch of a dial indicator and label its parts.

- SUM25 (Q4b, 04 marks)

11. Define (i) Roundness (ii) Parallelity (iii) Perpendicularity.

- W23 (Q2a(OR), 03 marks)

Unit 3: Measurement of Surface Roughness

Repeated Questions:

1. **Differentiate between Roughness and Waviness.**
 - **Appeared in:** SUM24 (Q3a, 03 marks), W23 (Q3b, 04 marks)
2. **Define the following terms: (1) C.L.A. (2) R.M.S. Value.**
 - **Appeared in:** SUM24 (Q3b, 04 marks - included CLA), SUM25 (Q4b(OR), 04 marks - included both)

Other Important Questions:

1. **Explain the working principle of Tomlinson surface meter with a neat sketch and state its advantages.**
 - SUM25 (Q4c(OR), 07 marks)
2. **Explain Talysurf surface roughness tester with a neat sketch.**
 - W24 (Q3c(OR), 07 marks)
3. **Define the following Terms: a) Roughness.**
 - SUM24 (Q3b, 04 marks)
4. **Define. (1) R.M.S value (2) C.L.A. value (3) Waviness (4) Lay.**
 - SUM25 (Q4b(OR), 04 marks)

Unit 4: Gear and Thread Measurement

Repeated Questions:

1. **Explain Parkinson's gear tester with a neat sketch.**
 - **Appeared in:** W24 (Q2c, 07 marks), SUM24 (Q3c, 07 marks), SUM25 (Q3b, 04 marks)
2. **List/Classify various types of gears.**
 - **Appeared in:** SUM24 (Q4a, 03 marks), W23 (Q3a(OR), 03 marks), SUM25 (Q3a, 03 marks)
3. **Define the following terms in respect of gear measurement: a) Addendum b) Circular Pitch.**
 - **Appeared in:** SUM23 (Q3a, 03 marks), SUM24 (Q4b(OR), 04 marks)
4. **Explain the three-wire method for measuring the effective diameter of a screw thread.**
 - **Appeared in:** SUM23 (Q2c, 07 marks), SUM24 (Q3c(OR), 07 marks)
5. **Define the following terminology of a screw thread.**
 - **Appeared in:** W24 (Q4a(OR), 03 marks), W23 (Q3a, 03 marks)

Other Important Questions:

1. **Explain gear tooth Vernier caliper with a neat sketch and label it.**
 - W23 (Q3c, 07 marks)
2. **Draw a neat sketch of gear tooth Vernier caliper and label its parts. Explain the chordal thickness method of gear tooth measurement.**
 - SUM25 (Q2c, 07 marks)
3. **Define the following in respect of gear measurement: c) Module.**
 - SUM23 (Q3a, 03 marks)
4. **Define following terms: a) Base circle b) Module.**
 - SUM24 (Q4b, 04 marks)
5. **Select the measuring method for measuring the circular pitch of a gear and explain it.**
 - W24 (Q4b, 04 marks)
6. **Differentiate between chordal thickness method and constant chord method.**
 - SUM24 (Q4a(OR), 03 marks)
7. **Select the measuring method for measuring the major diameter of an external thread and explain it.**
 - W24 (Q4b(OR), 04 marks)
8. **List methods for measuring the effective diameter of a thread and explain any two.**
 - W24 (Q4c(OR), 07 marks)

9. **Explain the two-wire method for measuring the effective diameter of a thread.**

- W23 (Q3b(OR), 04 marks)

10. **List various elements of thread measurement.**

- SUM25 (Q3a(OR), 03 marks)

11. **Draw a neat sketch of screw thread terminology of an internal and external thread.**

- SUM25 (Q3b(OR), 04 marks)

Unit 5: Limit Gauges, Transducers and Sensors

Repeated Questions:

1. **Explain LVDT (Linear Variable Differential Transducer) with a neat sketch.**
 - **Appeared in:** W24 (Q5c, 07 marks), SUM24 (Q4c(OR), 07 marks), W23 (Q5c, 07 marks), SUM25 (Q5b, 04 marks)
2. **Explain Piezo-electric type transducer with a neat sketch.**
 - **Appeared in:** SUM24 (Q5c(OR), 07 marks), W23 (Q4b(OR), 04 marks), SUM25 (Q5c, 07 marks)
3. **Differentiate between Measurement and Gauging.**
 - **Appeared in:** SUM23 (Q4a, 03 marks), SUM24 (Q4c, 07 marks)
4. **Explain: 1) Primary Transducer 2) Secondary Transducer.**
 - **Appeared in:** SUM23 (Q4b(OR), 04 marks), W23 (Q4a(OR), 03 marks)
5. **Explain Plug Gauge with a neat sketch.**
 - **Appeared in:** SUM23 (Q4b, 04 marks), SUM25 (Q5b(OR), 04 marks)

Other Important Questions:

1. **Select the type of limit gauge used for measuring (1) Internal hole diameter (2) External shaft diameter, explain with a neat sketch.**
 - W24 (Q4c, 07 marks)
2. **Write advantages of limit gauges.**
 - W23 (Q4a, 03 marks)
3. **Explain limit gauge. State advantages, limitations, and precautions to be observed while using limit gauge.**
 - SUM25 (Q5c(OR), 07 marks)
4. **List the applications of Plug Gauge, Ring Gauge, and Snap Gauge.**
 - SUM25 (Q5a(OR), 03 marks)
5. **Give the classification of transducers.**
 - SUM25 (Q5a, 03 marks)
6. **List the different types of transducers used for measuring the following 1) Pressure 2) Temperature 3) Flow.**
 - SUM23 (Q4a(OR), 03 marks)
7. **Explain the working principle of an inductance type transducer with a neat sketch. Also, write its advantages and disadvantages.**
 - SUM23 (Q4c, 07 marks)
8. **Draw a neat sketch of 1) L.V.D.T. 2) Piezo-electric type transducer.**

- SUM23 (Q4c(OR), 07 marks)

9. Classify Sensors and write their applications.

- W23 (Q4c, 07 marks)

10. List the applications in which transducers and sensors are used as a safety measurement.

- W24 (Q4c(OR), 07 marks)

11. Define the following terms: 1) limit 2) allowance 3) tolerance 4) fits 5) sensitivity 6) threshold 7) resolution.

- W23 (Q4c(OR), 07 marks)

Unit 6: Temperature and Pressure Measurement

Repeated Questions:

1. **Explain the working principle of a Thermocouple with a neat sketch.**
 - Appeared in: W24 (Q5b(OR), 04 marks), SUM23 (Q5c, 07 marks), SUM25 (Q3c(OR), 07 marks)
2. **Explain the working principle of a Bourdon tube pressure gauge with a neat sketch.**
 - Appeared in: SUM24 (Q5b(OR), 04 marks), W23 (Q5a(OR), 03 marks)
3. **Differentiate between a Resistance Thermometer and a Thermocouple.**
 - Appeared in: SUM24 (Q5a, 03 marks), SUM23 (Q5a, 03 marks)
4. **Explain the working principle of a Radiation Pyrometer with a neat sketch.**
 - Appeared in: SUM24 (Q5b, 04 marks), W23 (Q5b, 04 marks)

Other Important Questions:

1. **Explain the working principle of an Optical Pyrometer with a neat sketch.**
 - W24 (Q5b, 04 marks)
2. **Write a short note on a Capacitance type pressure transducer with a neat sketch.**
 - SUM24 (Q5c, 07 marks)
3. **Draw a neat sketch of a Dead weight piston gauge and label its parts.**
 - W24 (Q5a, 03 marks)
4. **Draw a neat sketch of a Capacitance type pressure transducer and label its parts.**
 - W24 (Q5a(OR), 03 marks)
5. **State the principle of a Thermocouple.**
 - W23 (Q5a, 03 marks)
6. **List types of Manometers and write their applications.**
 - W23 (Q5b(OR), 04 marks)
7. **Explain the working principle of an Inclined tube manometer with a neat sketch.**
 - SUM23 (Q5b(OR), 04 marks)
8. **State the factors affecting the selection of a pressure measuring device.**
 - SUM23 (Q5a(OR), 03 marks)
9. **Mention the application of the following: 1) Pressure capsule 2) Bellow 3) Bourdon tube 4) Diaphragm.**
 - SUM23 (Q5b(OR), 04 marks)
10. **Classify various pressure measuring devices and write a short note on a Bourdon tube pressure gauge.**
 - SUM25 (Q3c, 07 marks)
11. **Explain the use of Temperature and Pressure measurement as a safety measure.**
 - W23 (Q5c(OR), 07 marks)
12. **Name 4 pressure measuring devices and draw a diagram of a 'U' tube manometer.**
 - SUM24 (Q5a(OR), 03 marks)
