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B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026 Automobile Engineering 6AE3-01 Measurement and Metrology ME, AE		

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt All ten questions from Part A. Five questions out of Seven questions from Part B and Three questions out of five questions in Part C.

Schematic diagram must be shown wherever necessary. Any data you feel missing suitably be assumed and stated Clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answers should be given up to 25 words only)

(10×2=20)

All questions are compulsory.

1. Define accuracy and precision.
2. Define wringing of slip gauge.
3. State seebeck effect.
4. What is a pyrometer used for?
5. Define roundness.
6. What is a bevel protractor used for? State the principle of its use.
7. What are limit gauges?
8. A load cell gives 2 mV output for 5 kN. Find the sensitivity.
9. What is reproducibility?
10. Name the four key elements of thread measurement.

PART - B

(Analytical / Problem Solving Questions)

(5×4=20)

Attempt any Five questions.

1. Explain generalized measurement system with a block diagram.
2. Sine bar (200 mm) is used to measure 30 degrees. Calculate height of slip gauges required.

3. Explain the working of any one mechanical comparator with a sketch. What are advantages and disadvantages of mechanical comparators?
4. A vernier caliper has 0.02 mm least count with MSR = 25 mm and VSR 12. Calculate size.
5. Describe flatness testing using optical flat.
6. In the measurement of surface roughness, height of successive ten peaks and troughs were measured from datum as 35, 25, 32, 20, 23, 18, 26, 24, 28 and 21 microns. If these measurements were obtained on 10 mm lengths, determine the CLA and RMS values for surface roughness.
7. How to check the composite error of the gears by using Parkinson gear testing machine? Explain in detail with a sketch.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions.

(3×10=30)

1. Discuss type of errors in measurement and methods to minimize them.
2. Explain sine bar construction, limitations and applications.
3. What is co-ordinate measuring machine? Explain basic elements and construction of CMM with a neat sketch. How is the probe system for CMM classified?
4. a) Discuss the function of bourdon tube pressure gauge in detail.
b) Explain torque measurement using strain gauge.
5. Explain flow measurement devices - rotameter, pitot tube and hot wire anemometer.