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**B. TECH.****THEORY EXAMINATION (SEM-IV) 2016-17****MEASUREMENT AND METROLOGY****Time : 3 Hours****Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION – A****1. Attempt all parts of the following questions: 10 x 2 = 20**

- (a) What is meant by static response?
- (b) Define interchangeability.
- (c) Mention any four precautions to be taken while using slip gauges.
- (d) What is progressive error in screw gauge?
- (e) Define limit and tolerance.
- (f) Name any four instruments used for temperature measurement.
- (g) Distinguish between force and torque.
- (h) What is comparator?
- (i) Define straightness.
- (j) What are the chances of errors using sine bars?

**SECTION – B****2. Attempt any five of the following questions: 5 x 10 = 50**

- (a) Give the structure of generalized measuring system and explain it in detail.
- (b) Explain in detail various types of errors that may arise in engineering measurements.
- (c) Explain with a neat sketch the construction and working of sigma comparator.
- (d) Explain the working principle of AC laser interferometer and explain how the straightness is measured?
- (e) Explain how V-Block and three point probe are used for measurement of roundness. What are the limitations of V-Block?
- (f) Describe with neat sketch the measurement of pitch of internal and external threads using a pitch measuring machine
- (g) With a sketch explain the displacement measurement using Linear Variable Differential Transformer (LVDT)
- (h) Explain the Taylor's principle of gauge design. Define ring gauge and plug gauge.

**SECTION – C****Attempt any two of the following questions: 2 x 15 = 30**

- 3** Describe with neat sketches:
  - (i) Thermocouples
  - (ii) Strain gauge torque meter
- 4** Describe the followings in connection with pressure measurement:
  - (i) Piezo-electric pressure transducer.
  - (ii) Variable capacitance transducer.
- 5**
  - (i) Explain with a neat sketch how a vernier caliper is used for linear measurements.
  - (ii) Why is sine bar not suitable for measuring angle above  $15^\circ$ .