

Printed Pages—4

TME—404

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 4082**

Roll No.

--	--	--	--	--	--	--	--	--	--

**B.Tech.**

FOURTH SEMESTER EXAMINATION, 2005-2006

**MEASUREMENT, METROLOGY AND CONTROL**

Time : 3 Hours

Total Marks : 100

- Note :**
- (i) Answer **ALL** questions.
  - (ii) All questions carry equal marks.
  - (iii) In case of numerical problems assume data wherever not provided.
  - (iv) Be precise in your answer.

1. Attempt **any four** parts of the following : (5×4=20)
- (a) How does active transducer differ from passive transducer. Give the suitable example of each type of transducer.
  - (b) Explain the following terms :
    - (i) Zero drift and sensitivity drift.
    - (ii) Precision and Accuracy.
  - (c) Discuss the dynamic performance characteristics of first order instrument in case of step input.
  - (d) Define true value and indicated value of a measurand. Derive a general expression for propagation of errors.

TME—404

1

[Turn Over

aktuonline.com Discuss the primary, secondary and tertiary measurement system.

(f) Write short note on recording devices.

2. Attempt *any four* parts of the following : (5×4=20)

- (a) Describe the resistance characteristics of thermistor.
- (b) Describe the basic concept of the seismic instrument.
- (c) What are strain rosettes, discuss.
- (d) Distinguish between the principle of operation of Hydraulic and Pneumatic load cells. Sketch a typical pneumatic load cell.
- (e) Explain with the help of suitable sketches the difference between the Bourdon tube and Diaphragm gauge used for pressure measurement.
- (f) Describe the working principle of linear variable differential transformer. Mention its advantages and limitations.

3. Attempt *any four* parts of the following : (5×4=20)

- (a) Discuss the characteristics of live and end standards.
- (b) Explain the following terms with suitable sketches :
  - (i) Clearance
  - (ii) Interference
- (c) For what purpose, slip gauge is used ? Discuss the different grades of slip gauges.
- (d) State the working principle of Mechanical and Optical comparator.

- (e) For what purpose, limit gauge is used ? Describe the construction of limit plug gauge.
- (f) State the uses of :
- (i) Universal surface gauge
  - (ii) Combination set
  - (iii) Wire gauge
  - (iv) Radius gauge
  - (v) Feeler gauge

4. Attempt *any two* parts of the following : (10x2=20)

- (a) What is meant by 'Lay' ? Enumerate the various types of lay and give the symbol of each. Define the following terms related to the surface texture assessment :
- (i) Roughness width
  - (ii) Waviness
  - (iii) Profile
  - (iv) Flaws
  - (v) Sampling length.
- (b) Describe the construction and working principle of optical flat. Mention the precautions taken in using the optical flat.
- (c) List the uses of Toolmaker's microscope. Sketch the Toolmaker's microscope and write the function of its various parts.

5. Attempt *any two* parts of the following : (10x2=20)

- (a) Distinguish between open loop and closed loop control system. Illustrate your answer by giving the examples of each type of control system. Point out the advantages of closed loop control system over open loop control system.

- (b) Draw the schematics of a hydraulic control system and describe the functions of its various components in brief. In what way the constant flow arrangement differ from the constant pressure arrangement.
- (c) Write short note on any one :
- (i) Transfer function.
  - (ii) Pneumatic controller.

- o O o -