

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

PAPER ID : 4082

Roll No.

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B.Tech.

(SEM. IV) THEORY EXAMINATION 2010-11

MEASUREMENTS, METROLOGY AND CONTROL

Time : 3 Hours

Total Marks : 100

Note : (1) Attempt all questions.

(2) All questions carry equal marks

(3) Assume any data if necessary.

1. Attempt any two parts : (10×2=20)
 - (a) Define the following characteristics of a measuring instrument :
 - (i) Range
 - (ii) Drift
 - (iii) Sensitivity
 - (iv) Hysteresis
 - (b) Discuss the following consideration with respect to selection of a transducer.
 - (i) Mechanical suitability
 - (ii) Electrical suitability.
 - (c) Name the various method developed for signal transmission. Discuss any two of them in detail.

2. Attempt any two parts : (10×2=20)
 - (a) With a neat sketch describe the construction and working of a hydraulic load cell.

- (b) Why temperature compensation is required in strain gauges ? Name different methods for temperature compensation and explain working of any one of them.
- (c) Explain the construction and working of bourdon tube pressure transducer with the help of suitable figure.

3. Attempt any two parts : (10×2=20)

- (a) Explain the working of sigma comparator with a neat sketch.
- (b) Write the functions of basic units of comparator. Discuss various merits and demerits of mechanical comparators.
- (c) Differentiate between the following :
 - (i) Standard and limit gauges
 - (ii) Fixed and Adjustable gauge.

4. Attempt any two parts : (10×2=20)

- (a) Describe the constructional features of tool maker microscope. Discuss its application in metrology with suitable example.
- (b) What is "macro geometrical errors" ? Discuss the working of spirit level to check straightness of a horizontal surface.
- (c) Explain the principle of optical flat with neat sketch for measurement of flatness.

5. Attempt any **two** parts :

(10×2=20)

- (a) Write application of following controller components.
- (i) Sensor
 - (ii) Amplification
 - (iii) Actuators
- (b) Discuss the advantages and limitations of following
- (i) Hydraulic controller
 - (ii) Pneumatic controller
- (c) What do you understand by transfer function ? Derive the expression for transfer function for spring mass damper system. (Assume suitable data and condition if required)