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Printed Pages—3

ME—404

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

PAPER ID : 4043

Roll No.

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B.Tech.

FOURTH SEMESTER EXAMINATION, 2004-2005

MEASUREMENT AND METROLOGY

Time : 2 Hours

Total Marks : 50

Note : Attempt *ALL* questions.1. Attempt *any three* parts of the following : (4x3=12)

- (a) What are the basic blocks of a generalised instruments system. Draw the various blocks and explain their function.
- (b) Distinguish between :
- (i) Threshold and Resolution
 - (ii) Precision and Accuracy
 - (iii) Digital and Analog
 - (iv) Direct and Indirect Method of Measurement
- (c) Define the word Transducer. What do you understand by active and Passive Transducer ?

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uptuonline.com (d) A platinum thermometer has a resistance of $150\ \Omega$ at 25°C . uptuonline.com

- (i) Find its resistance at 65°C if the platinum has the resistance temperature coefficient of $0.00392/^\circ\text{C}$
 - (ii) If the thermometer has a resistance of $150\ \Omega$ calculate the temperature.
- (e) Define fits. Describe the various types of fits in brief.

2. Attempt *any two* parts of the following : (6x2=12)

- (a) Write short notes on the following :
 - (i) Microprocessor based Data Acquisition System
 - (ii) Typical Communication System
- (b) Describe the function of a stroboscope, explain how speed of rotating shaft can be measured using a single pattern or multipattern disc.
- (c) Draw diagrams to show how LVDT's can be used with Bellows elements and Bourdon tubes for measurements of pressure. Give their advantages and disadvantages.

3. Attempt *any two* parts of the following : (6x2=12)

- (a) (i) What is a strain gauge ? What are the types of strain gauge ? explain "Bonded wire" strain gauge with neat sketches.

- (ii) A resistance wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stress of 100 MN/m^2 the modulus of elasticity of steel is 200 GN/m^2 .
- Calculate the % change in the value of gauge resistance due to the applied stress.
- (b) (i) Describe the construction of a seismic type vibration transducer with a neat sketch.
- (ii) Describe the construction and working of thermocouple.
- (c) What are sine-bars and how are they used for angular measurement.
4. Attempt *any two* parts of the following : (7x2=14)
- (a) Define the term primary texture and secondary texture. State and explain the methods of measuring primary texture of a surface.
- (b) Why monochromatic light is used for interferometry work. Sketch and describe any one of the following interferometer.
- (i) Michelson Interferometer
- (ii) Laser Interferometer
- (c) Write short notes on the following :
- (i) Standardization and Interchangeability
- (ii) Allowances and Tolerances
- (iii) Pitch gauge filler gauge, slip gauge

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