

Roll No.

24358

B. Tech. 6th Semester (M.E.)

Examination – May, 2014

Measurement and instrumentation

Paper : ME-310-F

Time : Three hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt any *five* questions selecting at least *one* question from each Unit.

1. (a) What do you understand by standards in mechanical measurements ? $2 \times 10 = 20$
- (b) Define range and span of the instrument.
- (c) What is meant by calibration ? Why is it done for measuring system.
- (d) What is a sensor ?

- (e) What is the use of a dial gauge ?
- (f) Define a comparator ? Name any two types of comparator.
- (g) What is a ramp input signal ?
- (h) Name the techniques used for flow visualisation.
- (i) State the law of intermediate metals in the context of thermocouples.
- (j) What is a strain gauge rosette ?

UNIT - I

2. (a) What is static calibration ? How it is done in mechanical measuring instruments. 10
 (b) Describe the difference between deflection and null type of instruments with suitable examples. 10
3. An instrument consists of a first order sensing element and a second order data presentation device. The time constant of the first order element is 0.01s and static sensitivity is 4 mV/°C. The second order device has an undamped natural frequency of 100 rad/s and damping ratio of 0.5, with static sensitivity of 5 mm/mV. Draw the Bode diagram, giving the natural frequency response of the system. 20

UNIT - II

4. Explain in details the construction working of linear variable differential transducer and piezo electric transducer.

5. Write short notes on :

20

- (i) Opto electrical transducer
- (ii) Balancing and calibration
- (iii) Analog and digital transducer

UNIT – III

6. Explain the construction working of Hydraulic load cell and Torque transducer. 20
7. What are the characteristics of Amplifiers? Explain the pneumatic and electrical amplifying elements in detail. 20

UNIT – IV

8. What do you mean by calibration of pressure measuring devices ? Explain the construction working of variable area meter. 20
9. What is a hot wire anemometer ? Describe its construction and principle of working. 20