

- (b) How are very high pressures measured ? Explain briefly with a neat sketch the construction and working of a Baridgman gauge used for measuring high pressures.
9. (a) Write the precaution which should be taken while making temperature measurements.
- (b) Classify the temperature measuring instruments, and indicate approximate temperature range of each category.

Roll No.

24358

B. Tech. 6th Semester (ME)
(Reappear) Examination – October, 2020

MEASUREMENTS AND INSTRUMENTATION

Paper : ME-310-F

Time : 1.45 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 : Attempt any *three* questions. All questions carry equal marks.

1. (a) Explain the first order system.
(b) Discuss the Digital Encoders.
(c) Explain the Compensators.
(d) What are thermistors ? What are their advantages ?
2. (a) Define measurement and explain its significance in our day to life and in various fields of engineering.

- (b) State the advantages and disadvantages of mechanical instruments over electrical/electronic instruments.
3. (a) A first-order system having a time constant of 0.1 second is used to measure a signal prescribed by the relation : $I_t = 3 \sin 2t + 0.4 \cos 10t$ Develop an expression for the corresponding output.
- (b) Distinguish between and give appropriate examples in each case :
- (i) Hysteresis and dead zone
 - (ii) Drift and reproducibility
 - (iii) Error and accuracy
4. What are transducers and how are they classified ? Explain their importance in an instrumentation process. Give some examples of mechanical transducers where there is a transduction from (i) force to displacement (ii) velocity to pressure (iii) temperature to displacement (iv) fluid pressure to displacement.
5. (a) Distinguish between (i) active and passive transducers (ii) input and output transducers (iii) analog and digital transducers. Illustrate your answer with suitable examples.

- (b) What information is needed to describe a transducer for a particular measurement ?
- (c) Explain the major considerations which govern the selection of an instrument transducer.
6. (a) Distinguish between force and torque. List the difference principles on which force measurements are made. sketch a Multilever platform scale and explain how it helps to measure large forces in terms of much smaller standard weights.
- (b) Explain the transducers which are used for the measurement of force.
7. List the different means normally used for torque measurement. Describe the procedure you would follow to mount four strain gauges on a mild steel circular shaft for torque measurement.
8. (a) List the various methods of flow measurement what is the significance of term 'inferential' as applied to flow meters ? Certain meters are known as variable head meters. Explain clearly what is meant by the designation variable head.