

Instrumentation System

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any **four** questions out of remaining **six** questions.

(3) **Figures** to the **right** indicate **full** marks.

1. (a) Determine the response of a First Order system to a step input. 5
- (b) What are basic requirements of a transducer ? 5
- (c) Explain any one method of signal conditioning. 5
- (d) Explain multi-channel Analog Multiplexed system. 5

2. (a) Explain the principle of Hall effect and how it can be used for measuring angular displacement. 10
- (b) Explain the operation of resistance strain gauges and hence derive the expression for gauge factor. 10

3. (a) Explain with neat diagram, Bonded Strain Gauge Accelerometer. 10
- (b) Give classification of flow meter depending upon principle of operation and hence state the relative characteristics of each type of flow meter. 10

4. (a) State the principle of Thermocouples. Explain with circuit diagram compensation of reference temperature variations. 10
- (b) Explain Absorbion type and Transmission type of Torque measurement. 10

5. (a) Explain with neat sketches, construction and working of Piezoelectric transducer. 10
- (b) Explain the principle and operation of Photo-voltaic cell. 10

6. (a) Give different types of load cell configuration. Hence explain effect of temp variations for force measurement. 10
- (b) Describe the dynamic response of second order instrument when subjected to a step input. 10

7. Write short notes on :- 20
 - (a) Virtual Instrumentation
 - (b) Optical Pyrometer
 - (c) Performance Characteristics of an Instrumentation System.
 - (d) Ultrasonic Flow Meter.