

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume **suitable data**, if **necessary** and state them **clearly**.
 (4) **Figures** to the **right** indicate **full** marks.

1. (a) What are the various mechanical and electrical defects produces noise in potentiometer, when used for displacement measurement ? 5
- (b) Explain why increasing the cross-sectional area of the end loops in foil-type strain gauges reduces transverse sensitivity. 5
- (c) Explain two factors in specifying the dynamic performance of a system. 5
- (d) Define transducer. What are active and passive transducers ? Give two examples of each. 5
2. (a) For the first order instrument, find the step response and ramp response. 10
- (b) What is gauge factor of a strain gauge ? With the help of proper circuits how the strain measurement is carried out ? Discuss the gauge factor for semiconductor strain gauge and metal strain gauge. 10
3. (a) Describe in detail with proper circuit diagram, how a variable capacitance transducer is used for displacement measurement ? State its advantages and disadvantages. Also state how much is the range of displacement can be measured ? 10
- (b) Discuss Resistance type temperature sensor with proper signal conditioning circuits. Compare thermistor with RTD. 10
4. (a) Discuss the piezoelectric transducer with signal-conditioning system for vibration measurement. 10
- (b) Explain any two methods for measurement of torque with proper circuits. 10
5. (a) Explain the mechanical pressure transducers and give any one transduction method for it. 10
- (b) What are the advantages of ultrasonic flow meter ? Explain how the measurement can be made independent of velocity of sound in transit time flow meter. 10
6. (a) Explain multi-channel Analog multiplexed system. Compare the digital multiplexed multi-channel data acquisition system with it. 10
- (b) Explain the following :-
 - (i) Seeback and Peltier effect in thermocouples 5
 - (ii) Comment on LVDT measuring circuit with phase sensitive detector. 5

7. Write short notes on any **three** :- 20
- (a) Hall Effect Transducer
 - (b) Photo Multiplier Tube
 - (c) Virtual Instrumentation