

- N.B. :** (1) Question No. 1 is **compulsory**.  
(2) Solve any **four** questions out of remaining **six** questions.  
(3) Draw **neat** sketches wherever **necessary**.

1. Write notes on (any **four**) :- 20
  - (a) Ladder diagrams
  - (b) Tuning of PID Controller
  - (c) LVDT
  - (d) A to D conversion technique
  - (e) Transducers for level measurement.
  
2. (a) Explain time domain analysis and frequency domain analysis of measurement systems. 10  
(b) Describe the method for measurement of temperature with use of : 10
  - (i) RTD
  - (ii) Thermistors
  - (iii) IC sensors.
  
3. (a) Explain the different principles of working of capacitive transducers. 10  
(b) Derive the equations for time response of a first order system when subjected to 10
  - (i) unit step input
  - (ii) unit ramp input

Draw the response curves and find the steady error in each case.
  
4. (a) Describe the terms (i) common mode gain (ii) differential mode gain (iii) common mode rejection ratio for differential amplifiers. Cite examples in the field of instrumentation where these terms play a significant role. 10  
(b) With neat diagrams, explain : 10
  - (i) Cascade control
  - (ii) Feed forward control.
  
5. (a) With the help of an example of any process, explain what you understand by the terms – process lag, control lag and dead time. 10  
(b) Explain digital data acquisition system with the help of a neat block diagram. 10
  
6. (a) Describe the various elements of Fuzzy logic. What are the advantages of a Fuzzy Controller ? 10  
(b) Explain data logger with the help of block diagram. 10
  
7. (a) Describe supervisory control in detail. 10  
(b) Explain the various methods of training neural networks. Enumerate some applications of neural networks. 10