

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** out of remaining **six** questions.  
 (3) Assume **suitable** data wherever **required** with justification.  
 (4) Draw neat **circuit** and /or **block diagram** to support your answer.

1. Solve any **four** :-
  - (a) Compare SCADA and Fuzzy Controller. 5
  - (b) Explain tuning of pneumatic PID controller. 5
  - (c) Discuss instrumentation amplifier. 5
  - (d) Compare PLC with Microcontroller. 5
  - (e) Discuss in brief adaptive control system mechanism with appropriate example. 5
  
2. (a) Explain distillation of hydro-carbon in the petroleum industry. 10  
 (b) Explain the construction and principle of operation of strain gauge. 10
  
3. (a) Draw schematic of typical data acquisition system for input of 8 processes variable in the range of 0 to 5 V dc and with ON/OFF control action required for each variable at the output. 10  
 (b) Explain any one process along with control diagram in the Food Industry. 10
  
4. (a) Explain in detail the various methods of flow measurements and discuss any one measurement system used in Chemical Industries. 10  
 (b) Discuss in brief the role of integral wind-up and antiwind-up circuits. 10
  
5. (a) Explain the construction and principle of operation of any **two** of the following :- 10
  - (i) LVDT
  - (ii) Piezoelectric transducers
  - (iii) Pitot tube.
 (b) What are the reverse acting controllers ? Explain any one in detail. 10
  
6. (a) Describe various methods to measure temperature above 2000 °C in a system. 10  
 (b) Describe 'textile yarn and fabric dyeing' process and 'dye cycle' fully. 10
  
7. Write detail notes on any **two** of the following :- 20
  - (a) Active filters
  - (b) Data loggers
  - (c) Measurement and control of 'pH of liquid' in the system
  - (d) An influent water treatment plant.