



- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Discuss the evolution of automation in detail. 8
- b) Obtain mathematical model of mixing process of two variables. 8

OR

2. a) Suppose a temperature range 20 degree Celsius to 120° Celsius is linearly characterized for standard current range 4 mA to 20 mA. What will be current value in mA for 660°C. Also find corresponding temperature for 6.5 mA. 8
- b) Define “Automation”. Explain the architecture of industrial automation. 8
3. a) Explain Nicholous Zigler method of PID tuning with example. 8
- b) The control system is represented by $G(s) = \frac{1}{(s+1)(s+2)(s+3)}$ tune the system using Ziegler-Nicholas method. 8

OR

4. a) Explain Cohen-Coon method of PID tuning with example. 8
- b) A liquid level control system linearly converts a displacement of 2 to 3m into 4 to 20 mA control signal. A relay serves two position controllers to open or close inlet valve. A relay closes at 12 mA and opens at 10 mA. Find- 8
 - a) The relation between displacement level and current and
 - b) The neutral zone or displacement gap in meters.
5. a) Draw schematics of feedback control system for- 8
 - a) Flow control
 - b) Temperature control
 - c) Pressure control
 - d) Liquid level control

b) Explain self and programmed adaptive with appropriate example. 8

OR

6. a) Write a note on ratio control system. 8

b) Write a short note on PID controllers. 8

7. a) Explain sinking and sourcing of dc field devices with PLC. 8

b) Explain in detail architecture of Programmable logic Controllers. 8

OR

8. a) Write a note on SCADA. 8

b) Design a ladder logic for traffic control system keep red light on for 25 sec, yellow for 5 sec and green light for 30 seconds. Also provide start and stop buttons. 8

9. a) Explain different fieldbus standards used in DCS. 8

b) Explain architecture of DCS in detail. 8

OR

10. a) Write note on SOE, TRENDS and LVS in DCS. 8

b) Write a short note on various videos available on DCS display. 8
