(3 Hours) **Total Marks: 80**

Note:

1. **Question No.1 is compulsory**
2. **Solve any THREE questions out of remaining FIVE questions.**
3. **Figure to the right indicate full marks.**
4. **Assume suitable data if required.**

Q 1 Answer the following:

a) Discuss different communication media used in SCADA with advantages and disadvantages. (04)

b) Compare engineering workstation and operator workstation. (04)

c) Explain operating cycle with respect to PLC (04)

d) What do you mean by MES? Discuss its advantages. (04)

e) Discuss SIL levels for low mode. (04)

Q 2 a) Draw and explain the generic architecture of DCS. (10)

b) Explain arithmetic instructions with respect to PLC ladder with a suitable example. (10)

Q 3 a) Give different types of DCS displays with significance of each type. (10)

b) Discuss protocol structure with respect to SCADA. (10)

Q 4 a) Define automation. Discuss different types of automation with a suitable example of each. (10)

b) Develop a PLC ladder for the traffic control system. Your answer should include process sequence, I/O mapping, graphical user interface and ladder diagram. (10)

Q5 a) Classify PLC according to the arrangement of its components and I/O capacity. (10)

b) Define scan interval with respect to SCADA and discuss the factors which affects it. (10)

Q6 Write short notes—(Any TWO)

a) Database management System (10)

b) Safety Instrumented system (10)

c) P, PI, PID controller (10)
