(3 Hours) [Total Marks: 80]

N.B: (1) Question No. **1** is compulsory.
(2) Attempt any **Three** questions from remaining.
(3) Figures to the right indicate full marks.

1. Answer the following:- [20]
   (a) What are the different automation tools? List the vendors.
   (b) Write a brief note on DCS flow sheet symbols.
   (c) Explain the functions of RTU in SCADA system.
   (d) Explain NO and NC relay type instructions of PLC. Give example for AND logic.

2. (a) Explain sinking and sourcing I/O modules of PLC with diagram. [10]
   (b) What are IEC standard PLC languages? [10]
   Write a PLC ladder program for the application described by following event sequence. Also represent GUI.
   i) Fill the tank to level A from valve A.
   ii) Fill the tank to level B from valve B.
   iii) Start a timer, heat and stir for 5 min.
   iv) Open the output valve C until the empty switch engages.

3. (a) Explain DCS integration with PLC and computer and also explain the methods of integration. [10]
   (b) What is the necessity of SIS? Explain in detail basis SIS layout with neat diagram. [10]

4. (a) What are the different applications of SCADA? Explain how SCADA can be used in application of the oil gas lift system. [10]
   (b) Explain ISA S95 in connection with MES and ERP enterprise. [10]

5. (a) What is the need of supervisory control in DCS. [05]
   (b) Define scan interval of SCADA system. Explain factors affecting scan interval. [05]
   (c) Explain memory organization of PLC in detail. [10]

6. Write Short note on:- (Any Two) [20]
   (a) Alarm Management system.
   (b) Compare PLC, DCS and SCADA systems.
   (c) Centralized and decentralized control system architecture and the problem with centralized controlling.

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