(3 Hours) [Total Marks : 80]
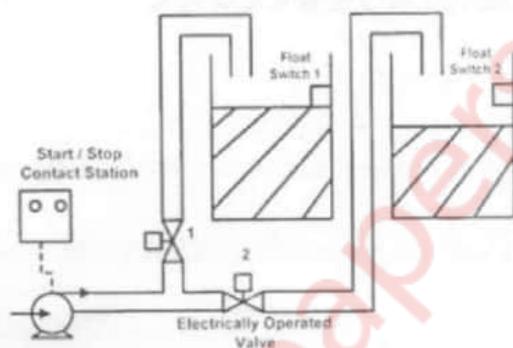
N.B: (1) **Question No. 1** is **compulsory**.
(2) Attempt **any Three** questions from remaining.
(3) **Figures** to the **right** indicate **full marks**.

1. Answer the following: - [20]
   a) What do you understand by automation and explain the benefits of automation?
   b) What are advantages of PLC over the relay logic systems? Illustrate with relevant examples.
   c) With neat block schematic, explain the functions of MTU.
   d) What are the functions Controller Module in DCS?

2. a) What is IEC standard PLC languages?
   Write a PLC Program using ladder logic for a process describe below according to following sequence: - [10]

   i) The pump is operating manually by a push-button "Start".
   ii) Start PB is pressed to start operation & V1 is open to fill the tank A.
   iii) When the first tank becomes full, the circuit should automatically start to fill the second tank by closing the first valve, and opening the second valve V2.
   iv) When the second tank is full, the pump disconnects automatically and a "sign lamp" is turned on to show that second tank is full.
   v) A stop button is pressed to stop operation.
   b) With neat circuit diagram, explain AC input module connected to PLC. [10]

3. a) Explain Evolution of DCS with neat sketch. [10]
   b) Explain the functions and task of supervisory computer in DCS. [10]

4. a) With neat sketch, explain how RTU communicate with field and MTU in SCADA. [10]
   b) Define scan interval of SCADA and explain the factors affecting it with examples. [10]

5. a) What is ERP? What are the benefits of integrating MES with ERP? [10]
   b) Explain the basic SIS layout with neat block diagram. [10]

6. a) What is the need of Alarm Management System?
   Name the standards related to AMS. Elaborate Alarm lifecycle model. [10]
   b) Compare PLC, DCS and SCADA systems. [10]

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