

(3 Hours)

[Total Marks :100

- N.B.:** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume **suitable** data wherever **necessary**.

1. (a) DCS is the synergy of supervisory control and DDC. Justify. 4
 (b) Give the specifications of H₂ Field-Bus. 4
 (c) Enlist any four applications of SCADA. 4
 (d) State the significance of introducing non-linearity function in an ANN. 4
 (e) What is 'membership function' in fuzzy logic control. 4
2. (a) Write a comprehensive note on 'Evolution of DCS'. 10
 (b) Describe the functions of controller module in DCS. 10
3. (a) In what way SCADA is different from other control systems ? Explain the same with the help of a block schematic. 10
 (b) What are the typical inputs and outputs of an RTU ? Explain the same with suitable examples. 10
4. (a) What is an HMI in DCS ? Which display will you need to get the following information/task and why ? 10
 (i) History of process parameters
 (ii) Realistic view of an equipment
 (iii) Tune the controller
 (iv) Control status at a glance
 (v) Alarms.
 (b) Explain the vertical model of a DCS. State the signal flow for one closed loop in detail. 10
5. (a) Explain construction and working of a Perception model of an ANN. State its advantages over earlier models. 10
 (b) Explain the following steps in connection with FLC for typical application :— 10
 (i) Membership Functions
 (ii) Fuzzy Rule Generation
 (iii) Defuzzification.
6. (a) Define 'Field-Bus'. State its features and types. What's its impact on process automation ? 10
 (b) Differentiate between 4-20 mA loop and FF loop. 10
 What are the ways of connecting field instruments to a field bus segment ?
7. Write short notes on (any **two**) :— 20
 (a) Learning algorithms in AANs.
 (b) ISO reference model and its significance to process control.
 (c) HART protocol and Hybrid control.
 (d) Design of control room for DCS.