E (ELEX) Sem VIII R-19 C-scheme 13-05-2025

(3 Hours) [Total Marks: 80]

N.B.: (1) Question No. 1 is Compulsory.
     (2) Attempt any three questions out of the remaining five.
     (3) Each question carries 20 marks and sub-question carry equal marks.
     (4) Assume suitable data if required.

1. (a) State and elaborate any two key differences between SCADA and IIoT systems. (5)
   (b) Explain the special requirements associated with IIoT sensors. (5)
   (c) Explain the Security model for IIoT systems. (5)
   (d) Highlight the importance of using MODBUS in IIoT applications with a practical (5)
      example of the same.

2. (a) Explain the principle of the Zigbee protocol. Highlight the various topologies (10)
      supported by Zigbee and list 4 important features of the protocol.
   (b) Describe the layered attacker model used in IIoT applications. Mention any two methods (10)
      to foil the attacks.

3. (a) Explain the following protocols converters: (10)
      i. USB to RS485
      ii. 4-20mA to RS485
   (b) Explain the Cloud /Server Architectural requirements in IIoT applications. (10)

4. (a) Explain in detail a Case Study of a Smart Energy monitoring system. (10)
   (b) Write a detailed note on the types of actuators used in IIoT. For a chosen application, (10)
      list the actuators used.

5. (a) Explain the features of a Human Machine Interface (HMI) and describe its role in IIoT (10)
      systems.
   (b) With an example, explain the integration of an IIoT system with the Cloud using (10)
      Thingspeak.

6. Write short notes on (Any 2): (20)

     i. Bluetooth Communication
     ii. IoT vulnerabilities
     iii. IEEE 802.15.4

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