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Question Paper Code	12162
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**

Sixth Semester

**Electrical and Electronics Engineering**

**20EEEL608 - INDUSTRIAL DATA COMMUNICATIONS**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. Compare serial and parallel transmission methods.  | <i>2,K2,CO1</i>               |
| 2. List out the layers in OSI model.  | <i>2,K1,CO1</i>               |
| 3. Compare balanced and unbalanced system into serial transmission.                             | <i>2,K2,CO2</i>               |
| 4. List out IEEE 802 LAN model layers.  | <i>2,K1,CO2</i>               |
| 5. What are the requirements of field buses?  | <i>2,K1,CO3</i>               |
| 6. State the HART protocol.   | <i>2,K1,CO3</i>               |
| 7. What are the different types of Modbus RTU messages?   | <i>2,K1,CO4</i>               |
| 8. What components are typically included in a SCADA system used for power distribution?        | <i>2,K1,CO4</i>               |
| 9. List the factors influencing energy consumption of sensor nodes in wireless sensor networks. | <i>2,K1,CO5</i>               |
| 10. Compare wireless HART and traditional HART communication.                                   | <i>2,K2,CO5</i>               |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |  |                  |
|--|------------------|
| 11. a) Explain the parity methods for error detection.                                   | <i>13,K2,CO1</i> |
| <b>OR</b>  |                  |
| b) Explain in detail about the 1-tier, 2-tier, 3-tier and N-tier model in communication. | <i>13,K2,CO1</i> |
| 12. a) Illustrate about USB of PC serial communications.                                 | <i>13,K2,CO2</i> |
| <b>OR</b>  |                  |
| b) Summarize in detail about repeater, hub, bridge, and router of LAN infrastructure.    | <i>13,K2,CO2</i> |
| 13. a) Explain HART and its concepts with a neat diagram.                                | <i>13,K2,CO3</i> |

**OR**

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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b) With a neat diagram outline the foundation field bus. *13,K2,CO3*

14. a) Discuss in detail how SCADA systems be used to monitor power quality and prevent power outages in distribution networks. *13,K2,CO4*

**OR**

b) What are the some practical cases for Modbus RTU? Discuss how it has benefited the organizations by implementing it in their industrial control systems. *13,K2,CO4*

15. a) With a neat sketch explain the sensor networks be used to monitor and manage environmental conditions, such as air quality, water quality, and weather patterns. *13,K2,CO5*

**OR**

b) Explain in detail about Zigbee module communication reliability and packet loss in noisy environments. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain in detail the network software's and operating systems used in data communications. *15,K2,CO2*

**OR**

b) Explain the various types of serial communication standards. *15,K2,CO3*