Reg. No.															

Question Paper Code	14165

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Sixth Semester

Electrical and Electronics Engineering

20EEEL608 - INDUSTRIAL DATA COMMUNICATIONS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The OSI model has how many layers? (a) 5 Layers (b) 6 Layers (c) 7 Layers (d) 8 Layers	1	K1	CO1
2.	Which of the following is used for error detection? (a) Protocol (b) Parity bit (c) Topology (d) ISO Model	1	K1	CO1
3.	The IEEE 802 standard is associated with: (a) Power systems (b) Local Area Networks (c) Microcontrollers (d) Analog Communications	1	K1	CO2
4.	What does MAC stand for in data communication? (a) Media Application Control (b) Multiple Access Channel (c) Media Access Control (d) Memory Access Control	1	K1	CO2
5.	Which protocol is used in HART communication? (a) TCP/IP (b) Bell 202 (c) PROFIBUS (d) Modbus	1	K1	CO3
6.	PLC stands for: (a) Programmable Logic Controller (b) Process Level Controller (c) Pulse Line Converter (d) None of the above	1	K1	CO3
7.	Modbus RTU is a type of: (a) Transport protocol (b) Application layer protocol (c) File protocol (d) Data link protocol	1	K1	CO4
8.	SCADA stands for: (a) Supervisory Control and Data Acquisition (b) Secure Control and Data Automation (c) Standard Control and Data Acquisition (d) None of the above	1	K1	CO4
9.	Wired communication in industries is preferred for: (a) Portability (b) Security (c) Flexibility (d) Interference	1	K1	CO5
10.	Which of the following is a wireless industrial standard? (a) ISA 100 (b) PROFIBUS (c) Foundation Fieldbus (d) Modbus RTU	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Compare serial and parallel data transmission.	2	K2	CO1
12.	Recall the purpose of using communication codes in data transmission.	2	K1	CO1
13.	List the role of Logical Link Control (LLC) in LAN.	2	K1	CO2
14.	Infer any two TIA/EIA interface signal functions.	2	K2	CO2
15.	What are the basic requirements of an industrial communication network?	2	K1	CO3
16.	Define the function of a Process Automation Controller (PAC).	2	K1	CO3
17.	Show two major applications of SCADA systems.	2	K2	CO4
18.	Why is communication security important in SCADA?	2	K2	CO4
19.	Give two reasons for choosing wired communication over wireless in critical applications.	2	K2	CO5
20.	What is the significance of grounding and shielding in wired industrial networks?	2	K1	CO5
21.	Name any two hardware components of a wireless sensor node.	2	K2	CO6

22.		Why is energy consumption important in wireless communication systems?	*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the ISO-OSI model in detail and compare it with the Internet model.	*11*	*K2*	*CO1*
		OR			
	b)	Describe various data exchange architectures used in industrial communication.	*11*	*K2*	*CO1*
24.	a)	Describe the IEEE 802 LAN architecture in detail.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the serial communication standards and PC serial communication with diagrams.	*11*	*K2*	*CO2*
25.	a)	Discuss the architecture, features, and advantages of PROFIBUS/PROFINET.	*11*	*K2*	*CO3*
		OR			
	b)	Compare and contrast HART, PROFIBUS, and Foundation Fieldbus.	*11*	*K2*	*CO3*
26.	a)	Describe SCADA architecture and explain its role in power distribution systems.	*11*	*K2*	*CO4*
		OR			
	b)	Explain Modbus RTU protocol with frame structure and communication flow.	*11*	*K2*	*CO4*
27.	a)	Explain the criteria for designing and selecting wired industrial networks.	*11*	*K2*	*CO5*
		OR			
	b)	Describe the working and use cases of Foundation Fieldbus in process industries.	*11*	*K2*	*CO5*
28.	a) (i)	How does SCADA improve the efficiency and reliability of power generation?	*6*	*K2*	*CO4*
	(ii)	Illustrate the network architecture of wireless sensor networks.	*5*	*K2*	*CO5*
		OR			
	b) (i)	What are the limitations of using wireless SCADA in industrial applications?	*6*	*K2*	*CO4*
	(ii)	Discuss methods to reduce energy usage.	*5*	*K2*	*CO5*