Reg. No.																

Question Paper Code	14138

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

Sixth Semester

Electronics and Instrumentation Engineering

20EIPC601 - INDUSTRIAL COMMUNICATION NETWORKS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which protocol is used for media access control in Ethernet? (a) Token passing (b) CSMA/CD (c) TDMA (d) FDMA	1	K2	CO1
2.	The OSI model consists of how many layers? (a) 5 (b) 6 (c) 7 (d) 8	1	K1	CO1
3.	RS-232 is a standard for _____ communication. (a) Parallel (b) Serial (c) Wireless (d) Fiber	1	K1	CO2
4.	Which device connects two or more networks and directs packets? (a) Switch (b) Repeater (c) Router (d) Hub	1	K2	CO2
5.	HART uses which signal standard for communication? (a) 4–20 mA (b) RS-485 (c) Ethernet (d) CAN	1	K2	CO3
6.	The primary function of a Fieldbus is to _____. (a) Store data (b) Control processes (c) Display signals (d) Power devices	1	K1	CO3
7.	MODBUS communication follows which type of protocol structure? (a) Token Ring (b) Master-Slave (c) Peer-to-Peer (d) Broadcast	1	K1	CO4
8.	PROFIBUS uses which of the following layers for communication? (a) Application (b) Data Link (c) Physical (d) All of these	1	K2	CO4
9.	Industrial Ethernet operates typically at which data rate? (a) 10 Mbps (b) 100 Mbps (c) 1 Gbps (d) 10 Gbps	1	K2	CO5
10.	Wireless HART operates in which frequency band? (a) 900 MHz (b) 2.4 GHz (c) 5 GHz (d) 433 MHz	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define data link control protocol.	2	K1	CO1
12.	Differentiate between command/response and token passing.	2	K2	CO1
13.	What are the main functions of a bridge and router?	2	K1	CO2
14.	State the special requirements of control networks.	2	K2	CO2
15.	Explain the evolution of HART signal standard.	2	K2	CO3
16.	What is interoperability in Fieldbus systems?	2	K2	CO3
17.	List any two PROFIBUS function codes.	2	K1	CO4
18.	What is the use of troubleshooting in MODBUS?	2	K2	CO4
19.	Mention the main components of a radio link.	2	K2	CO5
20.	Define ISA100 standard.	2	K1	CO5
21.	What does OPC stand for in industrial communication?	2	K1	CO3
22.	What are the role and importance of gateways in industrial communication networks?	2	K2	CO2

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the OSI model in detail with neat sketch.	*11*	*K2*	*CO1*
		OR			
	b)	Illustrate and explain switching techniques used in data networks with neat diagram.	*11*	*K2*	*CO1*
24.	a)	Compare RS232 and RS485 standards with suitable diagrams.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the working of routers and gateways in industrial networks.	*11*	*K2*	*CO2*
25.	a)	Explain the architecture and applications of HART protocol.	*11*	*K2*	*CO3*
		OR			
	b)	Discuss Fieldbus topology and interoperability with examples.	*11*	*K2*	*CO3*
26.	a)	Examine the structure and operational flow of the MODBUS protocol by breaking down its layers and message frame components.	*11*	*K2*	*CO4*
		OR			
	b)	Compare and analyze the PROFIBUS communication model and protocol stack to identify how data exchange and system coordination are achieved.	*11*	*K2*	*CO4*
27.	a)	Differentiate Industrial Ethernet from traditional Ethernet based on architecture, performance and real-time reliability.	*11*	*K2*	*CO5*
		OR			
	b)	Examine the operational structure and key components of Wireless HART to determine how it ensures secure and reliable communication.	*11*	*K2*	*CO5*
28.	a)	Assess and justify an industrial communication setup integrating PROFIBUS and Fieldbus for a process plant.	*11*	*K2*	*CO4*
		OR			
	b)	Evaluate and recommend an efficient wireless network configuration suitable for modern industrial automation.	*11*	*K2*	*CO4*