Reg. No.															

Question Paper Code	13631

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 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 layer of the OSI model is responsible for logical addressing? (a) Physical (b) Network (c) Transport (d) Data Link	1	K1	CO1
2.	What does HDLC stand for? (a) High Data Link Control (b) High-Level Data Link Control (c) Hybrid Data Link Communication (d) Hardware Data Link Control	1	K1	CO1
3.	Which device connects two different networks and determines the best path for data transmission? (a) Bridge (b) Router (c) Switch (d) Repeater	1	K1	CO2
4.	What is the maximum number of devices RS-485 supports in a network? (a) 1 (b) 10 (c) 32 (standard) or more with repeaters (d) Unlimited	1	K1	CO2
5.	What is the advantage of HART over conventional analog communication? (a) Higher data transmission speed (b) Simultaneous analog and digital communication (c) Requires no external power supply (d) Works only with wireless devices	1	K1	CO3
6.	Name the typical topology used in Fieldbus networks? (a) Star (b) Bus (c) Ring (d) Mesh	1	K1	CO3
7.	What does PROFIBUS stand for? (a) Process Field Bus (b) Protocol for Industrial Bus (c) Professional Field Bus (d) Programmable Field Bus	1	K1	CO4
8.	What is the purpose of a Data Highway in industrial networking? (a) Provides a high-speed communication path for industrial devices (b) Connects office computers to the internet (c) Used only for data storage (d) Controls power distribution	1	K1	CO4
9.	Select the data transmission speed of standard Ethernet (10BASE-T)? (a) 1 Mbps (b) 10 Mbps (c) 100 Mbps (d) 1 Gbps	1	K1	CO5
10.	What is the primary advantage of ISA 100 over traditional wired industrial networks? (a) Supports secure wireless communication (b) Provides unlimited bandwidth (c) Does not require power (d) Only works with Ethernet	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define topology. What are the different types of topology?	2	K1	CO1
12.	What is the difference between a hub and a switch?	2	K1	CO1
13.	How does CSMA/CD help in collision detection?	2	K1	CO1
14.	Explain the advantage of using a bridge in a network.	2	K2	CO2
15.	How does Token Passing work in ARCNET?	2	K1	CO2
16.	State the primary function of the Actuator Sensor (AS) interface.	2	K1	CO2

17.	Define interoperability in the context of Fieldbus communication.		*2*	*K1*	*CO3*
18.	Name two key applications of the HART protocol in industrial automation.		*2*	*K1*	*CO3*
19.	Mention the function of MODBUS function codes.		*2*	*K2*	*CO4*
20.	What is the function of a Data Highway in industrial networking?		*2*	*K1*	*CO4*
21.	What are the key components of a radio link in wireless communication?		*2*	*K1*	*CO5*
22.	Name two advantages of using ISA 100 over wired communication in industrial automation.		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the seven layers of the OSI model with their functions used at each layer.	*11*	*K2*	*CO1*
		OR			
	b)	Explain the TCP/IP model in detail, comparing it with the OSI model. Discuss the protocols used at each layer.	*11*	*K2*	*CO1*
24.	a)	Describe about the RS 485 configuration with neat diagram.	*11*	*K2*	*CO2*
		OR			
	b)	What is the function of a bridge in a network, and how does it help reduce network traffic?	*11*	*K2*	*CO2*
25.	a)	Describe the general architecture of a Fieldbus system and explain its key components.	*11*	*K2*	*CO3*
		OR			
	b)	Explain the structure and functioning of a HART network.	*11*	*K2*	*CO3*
26.	a)	Explain the structure of the MODBUS protocol and describe its key components.	*11*	*K2*	*CO4*
		OR			
	b)	Describe the system operation in PROFIBUS and how it ensures reliable communication.	*11*	*K2*	*CO4*
27.	a)	Explain the working of a radio modem and how it facilitates wireless data transmission in industrial automation.	*11*	*K2*	*CO5*
		OR			
	b)	Compare and contrast 10 Mbps, 100 Mbps, and Gigabit Ethernet in terms of speed, performance, and application areas.	*11*	*K2*	*CO5*
28.	a) (i)	Compare and contrast MODBUS RTU, MODBUS ASCII.	*6*	*K2*	*CO4*
	(ii)	Discuss the advantages and limitations of using wireless communication in industrial networks.	*5*	*K2*	*CO5*
		OR			
	b) (i)	Compare Foundation Fieldbus with traditional 4-20mA analog communication systems.	*6*	*K2*	*CO4*
	(ii)	Discuss the importance of network topology in Wireless HART and how the mesh topology ensures reliability.	*5*	*K2*	*CO5*