Reg. No.																

Question Paper Code	14377

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Sixth Semester

Electronics and Instrumentation Engineering

20EIPC601 - INDUSTRIAL COMMUNICATION NETWORKS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	Select the below switching technique that transmits data in small units called packets. a) Circuit switching b) Packet switching c) Message switching d) Virtual switching	*1*	*K3*	*CO1*
2.	Choose the layer of the OSI model , responsible for framing. a) Data Link Layer b) Transport Layer c) Physical Layer d) Network Layer	*1*	*K2*	*CO1*
3.	Examine the MAC method which allows multiple devices to share the same transmission medium? a) Token Passing b) CSMA/CD c) Token Passing d) ALOHA	*1*	*K3*	*CO1*
4.	Choose the statement that best explains the purpose of a router in inter-networking? a) Connects devices within the same network. b) Amplifies network signals c) Connects multiple networks and forwards data packets d) Converts digital signals to analog	*1*	*K3*	*CO2*
5.	What is the purpose of the AS-Interface? a) High-speed internet access b) Connecting sensors and actuators in automation systems c) Cloud storage d) Data encryption	*1*	*K1*	*CO2*
6.	Which of the following is an advantage of RS-485 over RS-232? a) Supports multiple devices (multi-drop network) b) Shorter cable length c) Higher cost d) Lower noise immunity	*1*	*K2*	*CO2*
7.	Examine the topology used in Fieldbus networks? a) Star b) Bus c) Ring d) Mesh	*1*	*K3*	*CO3*
8.	Choose the type of signaling does HART use? a) FSK b) PCM c) AM d) PM	*1*	*K2*	*CO3*
9.	Examine the type of industrial network protocol specifically designed for real-time control and communication? a) Ethernet b) DeviceNet c) Bluetooth d) Wi-Fi	*1*	*K3*	*CO3*

10.	Identify the type of cable commonly used in Industrial Ethernet networks? a) Coaxial cable b) Twisted pair cable c) Fiber optic cable d) Both b and c	*1*	*K2*	*CO4*
11.	Select the best characteristic of Foundation Fieldbus communication? a) Master-Slave communication b) Deterministic scheduling of messages c) Peer-to-Peer communication only d) Uses only serial communication	*1*	*K3*	*CO4*
12.	What type of communication protocol is MODBUS? a) Analog b) Digital c) Hybrid d) Optical	*1*	*K1*	*CO4*
13.	Which standard represents Fast Ethernet? a) 10BASE-T b) 100BASE-T c) 1000BASE-T d) 10GBASE-T	*1*	*K1*	*CO5*
14.	Identify for which type of communication standard is ISA 100.11 designed for? a) Wireless industrial automation b) High-speed internet c) Satellite communication d) Fiber-optic networks	*1*	*K2*	*CO5*
15.	How does Wireless HART ensure reliability in communication? a) By using redundant communication paths b)By increasing power transmission c) By reducing network speed d)By limiting the number of connected devices	*1*	*K1*	*CO5*
16.	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 – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Identify the significance of Token Bus and Token Ring topology.	*3*	*K3*	*CO1*
18.	Examine the advantages of packet switching over circuit switching.	*3*	*K4*	*CO1*
19.	Organise the uses of Master slave in HART communication.	*3*	*K3*	*CO2*
20.	Construct type of protocols are typically used in industrial Ethernet for real-time control.	*3*	*K3*	*CO2*
21.	Apply interoperability in the context of Fieldbus communication and explain.	*3*	*K3*	*CO3*
22.	Compare MODBUS RTU and MODBUS ASCII.	*3*	*K4*	*CO4*
23.	Discover the significance of PROFIBUS protocol stack and explain how it follows the OSI model.	*3*	*K4*	*CO4*
24.	Illustrate , why fiber optic cable is preferred in industrial Ethernet networks.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a) Model the different network topologies with neat diagram and explain.	*12*	*K3*	*CO1*
	OR			
	b) Construct the TCP/IP model in detail, comparing it with the OSI model.	*12*	*K3*	*CO1*

26.	a)	Construct in detail about the evolution of signal standards leading to the development of HART communication protocol.	*12*	*K3*	*CO2*
		OR			
	b)	Organize how does bridges help to reduce network traffic and also explain the function of bridges in Industrial network.	*12*	*K3*	*CO2*
27.	a)	Identify the different network structures used in HART communication and compare point-to-point and multi-drop configurations.	*12*	*K3*	*CO3*
		OR			
	b)	Choose an important application of HART protocol in process control and industrial automation and explain in detail.	*12*	*K3*	*CO3*
28.	a)	Distinguish PROFIBUS DP and PROFIBUS PA in terms of functionality, applications and communication mechanisms.	*12*	*K4*	*CO4*
		OR			
	b)	Examine the concept of Data Highway and explain its importance in industrial networking.	*12*	*K4*	*CO4*
29.	a)	Compare and contrast 10 Mbps, 100 Mbps, and Gigabit Ethernet in terms of speed, performance and application areas.	*12*	*K4*	*CO5*
		OR			
	b)	Compare the advantages and challenges of implementing ISA 100 and ISA 100.11a in process automation industries.	*12*	*K4*	*CO5*