SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

Approved by AICTE, Affiliated to Anna University, Chennai, Accredited by NBA,
'A' Grade Accreditation by NAAC & ISO 9001:2015 Certified Institution
SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

V II SEMESTER

1907702-INDUSTRIAL DATA NETWORKS
Regulation - 2019

Academic Year 2025 - 2026 (ODD Sem)

QUESTION BANK

Prepared by

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SUBJECT   : 1907702-INDUSTRIAL DATA NETWORKS

SEM/YEAR : VII/IV

UNIT I - DATA NETWORK FUNDAMENTALS			
Networks hierarchy and switching – Open System Interconnection model of ISO - Data link control protocol - Media access protocol - Command / response - Token passing - CSMA/CD, TCP/IP.			
PART – A			
Q.No.	Questions	BT Level	Competence	Course Outcome
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1.	Define line configuration.	BTL-1	Remember	CO 1
2.	List the disadvantages of asynchronous communication.	BTL-2	Understand	CO 1
3.	Summarize the limitations of using a circuit-switching network for data transmission.	BTL-2	Understand	CO 1
4.	Compose the applications of networks.	BTL-6	Create	CO 1
5.	Discuss about the term packet switching.	BTL-2	Understand	CO 1
6.	Distinguish X-modem and Y-modem.	BTL-4	Analyze	CO 1
7.	Classify the types of data link protocol.	BTL-3	Apply	CO 1
8.	Assess the mechanism of poll/select.	BTL-5	Evaluate	CO 1
9.	Write the mechanism of sliding window flow control.	BTL-6	Create	CO 1
10.	Illustrate open system model.	BTL-3	Apply	CO 1
11.	Define topology. What are the different types of topologies?	BTL-1	Remember	CO 1
12.	What is mean by Command / response?	BTL-2	Understand	CO 1
13.	Define network.	BTL-1	Remember	CO 1
14.	Define CSMA/CD protocol.	BTL-1	Remember	CO 1
15.	Define protocol.	BTL-1	Remember	CO 1
16.	Compare circuit switching and packet switching.	BTL-4	Analyze	CO 1
17.	Mention the modes in HDLC data link control protocol.	BTL-5	Evaluate	CO 1
18.	List the benefits of token passing protocol for media access.	BTL-1	Remember	CO 1
19.	Analyze how the three HDLC frame types differ from one another.	BTL-4	Analyze	CO 1
20.	Classify different categories of networks.	BTL-3	Apply	CO 1

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21.	What is TCP/IP?	BTL-2	Understand	CO 1
22.	Differentiate between character oriented and bit oriented protocol.	BTL-3	Apply	CO 1
23.	Assess the term data transparency.	BTL-5	Evaluate	CO 1
24.	Analyze how many layers available in OSI model?	BTL-4	Analyze	CO 1

	PART-B			
1.	(i) Mention the different types of network topologies with neat diagram. **(7)** (ii) Explain the different categories of networks and transmission mode with neat sketch. **(6)**	BTL-3	Apply	CO 1
2.	Discuss in detail about the functions of ISO-OSI layers. **(13)**	BTL-2	Understand	CO 1
3.	Discuss about communicating devices and network hierarchy. **(13)**	BTL-2	Understand	CO 1
4.	Examine HDLC in terms of frame format and frame contents. **(13)**	BTL-1	Remember	CO 1
5.	Analyze the difference between the basic control format and extended control format with HDLC. **(13)**	BTL-4	Analyze	CO 1
6.	(i) Explain about the operation of command-response mode in detail. **(6)** (ii) Compare token bus and token ring in detail. **(7)**	BTL-4	Analyze	CO 1
7.	Illustrate about Open Systems Interconnect model with neat diagram. **(13)**	BTL-3	Apply	CO 1
8.	Write short notes on TCP/IP layer protocol. Also compare TCP/IP with OSI. **(13)**	BTL-4	Analyze	CO 1
9.	(i) Sketch and explain the model of TCP/IP and also discuss the choice of protocols available in every layer of the same. **(10)** (ii) Give the limitations that exist when the reduced OSI model is implemented. **(3)**	BTL-2	Understand	CO 1
10.	Design the Go-back N ARQ and selective reject ARQ selective error mechanism with flow diagram. **(13)**	BTL-6	Create	CO 1
11.	Describe in detail about the token passing protocol. **(13)**	BTL-1	Remember	CO 1
12.	Discuss about packet switching and message switching in detail. **(13)**	BTL-2	Understand	CO 1
13.	Describe about the concept of switching and explain about circuit switching in detail. **(13)**	BTL-1	Remember	CO 1
14.	Explain how media is accessed and collision is detected in CSMA/CD with neat flow diagram. **(13)**	BTL-5	Evaluate	CO 1
15.	Describe about asynchronous and synchronous protocols with neat diagram. **(13)**	BTL-1	Remember	CO 1
16.	Explain about CAMA/CD protocol with neat sketch. **(13)**	BTL-3	Apply	CO 1
17.	Infer about medium access control mechanism. **(13)**	BTL-5	Evaluate	CO 1

	PART-C			
1.	Draw the segment format of TCP and explain the steps involved in connection establishment and connection termination. **(15)**	BTL-6	Create	CO 1
2.	Summarize the CSMA/CD MAC technique with necessary diagrams. **(15)**	BTL-5	Evaluate	CO 1
3.	Develop a process for establishing a link, exchange the frames and terminating	BTL-6	Create	CO 1

	the link using high level data link protocol with suitable example. **(15)**			
4.	Explain the network hierarchy and compare the performances of Packet switching, Message switching and Circuit switching. **(15)**	BTL-5	Evaluate	CO 1
5.	Explain in detail about Data link control protocol with neat diagram. **(15)**	BTL-5	Evaluate	CO 1

	UNIT II - INTERNET WORKING and RS 232, RS 485
	Bridges - Routers - Gateways - Standard ETHERNET and ARCNET configuration special requirement for networks used for control - RS 232, RS 485 configuration Actuator Sensor (AS) – interface, Devicenet

	PART – A			
Q.No.	**Questions**	**BT Level**	**Competence**	**Course Outcome**
1.	Define the term router.	BTL-1	Remember	CO 2
2.	Summarize the concept of socket address.	BTL-5	Evaluate	CO 2
3.	Differentiate Intranet and Internet.	BTL-2	Understand	CO 2
4.	Write the difference between Fast Ethernet and Gigabit Ethernet.	BTL-6	Create	CO 2
5.	List the main elements of distance vector routing.	BTL-1	Remember	CO 2
6.	Classify the different cabling in Ethernet communication.	BTL-3	Apply	CO 2
7.	Discuss about the relationship between a switch and router.	BTL-2	Understand	CO 2
8.	Quote the function of gateways..	BTL-1	Remember	CO 2
9.	Assess the main reasons for collision on an Ethernet network.	BTL-5	Evaluate	CO 2
10.	What is Fast Ethernet? What are the types of Ethernet?	BTL-1	Remember	CO 2
11.	Express the two ASCII character used in RS-232 software handshaking.	BTL-2	Understand	CO 2
12.	Point out the limitations of RS-232.	BTL-4	Analyze	CO 2
13.	Classify the various transmission line effects on digital pulses.	BTL-3	Apply	CO 2
14.	Give the four wire network configuration of EIA-485 network.	BTL-2	Understand	CO 2
15.	Point out the various modes of operation in RS-485.	BTL-1	Remember	CO 2
16.	List the Configuration and features of ARC net.	BTL-4	Analyze	CO 2
17.	Specify any four faults monitoredby AS-i fault monitoring system.	BTL-1	Remember	CO 2
18.	Compare RS 232 with RS 485 communication standard.	BTL-4	Analyze	CO 2
19.	Mention the hardware handshaking lines used in the RS-232.	BTL-3	Apply	CO 2
20.	Formulate the Manchester code for the data signal 001001.	BTL-6	Create	CO 2
21.	Define the term repeater.	BTL-2	Understand	CO 2
22.	Mention the various functions of bridges.	BTL-3	Apply	CO 2
23.	Assess the shortest path for adaptive routing.	BTL-5	Evaluate	CO 2
24.	Analyze various functions of Devicenet.	BTL-4	Analyze	CO 2
	PART-B			

1.	Describe the topology, cabling and encoding scheme used in Ethernet communication. **(13)**	BTL-1	Remember	CO 2
2.	**(i)** Discuss about the ARC net configuration with neat diagram.**(10)** **(ii)** Summarize the salient features of ARC net. **(3)**	BTL-2 BTL-5	Understand Evaluate	CO 2
3.	Discuss about the various Ethernet standards for networks. **(13)**	BTL-2	Understand	CO 2
4.	List the various Ethernet technologies and explain each type. **(13)**	BTL-1	Remember	CO 2
5.	**(i)** Explain open system with bridge configuration. **(6)** **(ii)** Illustrate the issues involved in the design of bridges. **(7)**	BTL-3	Apply	CO 2
6.	**(i)** What is the importance of using Gateways? **(5)** **(ii)** Quote the special requirements for networks used for control. **(8)**	BTL-1	Remember	CO 2
7.	**(i)** Write the functions of repeaters and explain each in detail. **(8)** **(ii)** Show the importance of Routers in an internet. **(5)**	BTL-3	Apply	CO 2
8.	**(i)** Tabulate the difference between the RS 232 and RS 485 standard. **(6)** **(ii)** Describe about the communication used in RS 232. **(7)**	BTL-1	Remember	CO 2
9.	Explain the topology, media access and formats of Actuator sensor interface network solution. **(13)**	BTL-4	Analyze	CO 2
10.	Discuss the working of physical layer of AS-i interface, AS-i Master call up and slave response frame format. **(13)**	BTL-2	Understand	CO 2
11.	Explain about the communication profile for Device net with necessary diagram. **(13)**	BTL-4	Analyze	CO 2
12.	Describe about the RS 485 configuration with neat diagram. **(13)**	BTL-2	Understand	CO 2
13.	Summarize the various features of standard Ethernets and compare the same with ARCNET. **(13)**	BTL-6	Create	CO 2
14.	Explain about the operation modes in RS 485. Can you convert RS 232 to RS485? Justify. **(13)**	BTL-4	Analyze	CO 2
15.	List the different types of routers and explain in detail. **(13)**	BTL-2	Understand	CO 2
16.	Explain bridges and gateways in detail with neat diagram. **(13)**	BTL-3	Apply	CO 2
17.	What is transparent bridge? Elaborate the process of learning involved in such a bridge to create dynamic forwarding tables. **(13)**	BTL-5	Evaluate	CO 2
PART-C				
1.	Illustrate the half duplex communication between 2 PC's using RS-232 interface standard with the help of sequence diagram. **(15)**	BTL-5	Evaluate	CO 2
2.	Show in detail about Hall-duplex operational sequence of RS-232 with neat flow sketch between DTE and DCE over public switched telephone network. **(15)**	BTL-5	Evaluate	CO 2
3.	**(i)** Can the length of an Ethernet be increased to many segments of 500 meters each merely by adding a repeater to connect each additional segment? Give reasons. **(10)** **(ii)** Define various strategies involved in designing Bridge from 802.X to 802.Y. **(5)**	BTL-6	Create	CO 2
4.	**(i)** Discuss the security aspect of internetworking when it is used for control			CO 2

	applications. **(8)** **(ii)** Elaborate the features of IEEE 802.3 Ethernet. **(7)**	BTL-5	Evaluate	
5.	Explain the connectionless gateway configuration and describe the process of transmitting a datagram from network to network. **(15)**	BTL-6	Create	CO 2

UNIT III - HART AND FIELDBUS

Introduction - Evolution of signal standard - HART communication protocol - HART networks – HART commands - HART applications – Field bus - Introduction - General Field bus architecture – Basic requirements of Field bus standard – Field bus topology - Interoperability - Interchangeability Introduction to OLE for process control (OPC).

PART – A

Q.No.	Questions	BT Level	Competence	Course Outcome
1.	List the different modes of digital transmission of data used by HART protocol.	BTL-1	Remember	CO3
2.	Show the difference between HART and Field bus.	BTL-3	Apply	CO3
3.	Classify Fieldbus standards.	BTL-3	Apply	CO3
4.	Examine briefly about the command "write polling address".	BTL-1	Remember	CO3
5.	Define interoperability.	BTL-2	Understand	CO3
6.	State the significance of HART Protocol.	BTL-1	Remember	CO3
7.	Analyze how OPC allow reusing applications with different sets of process interface equipment.	BTL-4	Analyze	CO3
8.	Generalize the different HART networks.	BTL-6	Create	CO3
9.	Discuss the two types of frame formats in HART protocol.	BTL-2	Understand	CO3
10.	Analyze how HART protocol linked with OSI model?	BTL-6	Create	CO3
11.	Express about a typical HART signal.	BTL-2	Understand	CO3
12.	Define Field bus.	BTL-1	Remember	CO3
13.	Summarize the drawbacks of Field bus.	BTL-5	Evaluate	CO3
14.	Point out various Field bus topology.	BTL-4	Analyze	CO3
15.	Define the frame format in HART protocol.	BTL-1	Remember	CO3
16.	Summarize the advantages of HART protocol.	BTL-5	Evaluate	CO3
17.	Give the advantages of Field bus.	BTL-2	Understand	CO3
18.	Analyze the operations of VCR.	BTL-4	Analyze	CO3
19.	Classify the operations of LAS.	BTL-3	Apply	CO3
20.	List the HART commands.	BTL-1	Remember	CO3
21.	What is OPC?	BTL-2	Understand	CO3
22.	What is mean by FMS?	BTL-3	Apply	CO3

23.	Give the advantages of OPC.	BTL-5	Evaluate	CO3
24.	Distinguish between interchangeability and interoperability.	BTL-4	Analyze	CO3

	PART – B			
1.	(i) Describe the command instruction formats and reference model of HART communication. **(8)**	BTL-1	Remember	CO3
	(ii) Explain typical application for HART communication protocol. **(5)**	BTL-3	Apply	
2.	Describe the various HART communication layers. **(13)**	BTL-1	Remember	CO3
3.	(i) Infer the precautions taken during wiring and installation of fieldbus system. **(6)**	BTL-4	Analyze	CO3
	(ii) With neat sketch, explain the different ways in which devices are connected to the Field bus. **(7)**			
4.	(i) Explain the origin and benefits of the Fieldbus systems. **(6)**	BTL-4	Analyze	CO3
	(ii) List the encoding logic with neat sketch and rules used by Field bus physical layer. **(7)**			
5.	Explain about the Field bus technology that supports various topologies. **(13)**	BTL-4	Analyze	CO3
6.	With neat sketch describe the general Field bus architecture. **(13)**	BTL-1	Remember	CO3
7.	Discuss in detail about the device commands of application layer of HART communication protocol with proper examples used by the host device to obtain and interpret field device data. **(13)**	BTL-6	Understand	CO3
8.	Discuss about structure and elements of HART communication systems. **(13)**	BTL-2	Understand	CO3
9.	Discuss about HART protocol implementation of OSI layer model. **(13)**	BTL-2	Understand	CO3
10.	(i) Describe the Physical layer of the HART protocol in detail. **(8)**	BTL-1	Remember	CO3
	(ii) Mentation the advantages and disadvantages of HART protocol. **(5)**			
11.	Discuss about the HSE and H1 in Field bus architecture with neat diagram. **(13)**	BTL-1	Remember	CO3
12.	Express the communication services in Field bus Message Specification and explain it. **(13)**	BTL-2	Create	CO3
13.	Explain in detail about the FAS with neat diagram. **(13)**	BTL-5	Evaluate	CO3
14.	Describe the general architecture and topologies used in fieldbus communication. **(13)**	BTL-1	Remember	CO3
15.	With neat diagram, explain the two possible configurations in which HART device can operate? **(13)**	BTL-2	Understand	CO3
16.	Discuss about the Data link layer of the HART protocol and HART frame format in detail. **(13)**	BTL-3	Apply	CO3
17.	Elaborate in detail the general architecture of Field bus in a DCS environment of your own choice. **(13)**	BTL-5	Evaluate	CO3

	PART – C			
1.	Evaluate the three classes of HART command set and list 6 commands in each. **(15)**	BTL-5	Evaluate	CO3

2.	Sketch the architecture of FOUNDATION field bus and give explanation on any of the five blocks. **(15)**	BTL-5	Evaluate	CO3
3.	Assess the need of OPC and list the benefits of OPC. **(15)**	BTL-6	Create	CO3
4.	Design a complete package that helps to build, test and deploy HART enabled product for a leading oil and gas company, which holds turbine meter, flow meters and flow computers. **(15)**	BTL-6	Create	CO3
5.	Elaborate in detail the general architecture of OLE for process control applications. **(15)**	BTL-5	Evaluate	CO3

UNIT IV- MODBUS AND PROFIBUS PA/DP/FMS AND FF

MODBUS protocol structure - function codes – troubleshooting Profibus, Introduction, Profibus protocol stack, Profibus communication model - communication objects - system operation - troubleshooting - review of foundation field bus - Data Highway.

PART - A				
Q.No.	**Questions**	**BT Level**	**Competence**	**Course Outcome**
1.	Classify the types of PROFIBUS.	BTL-3	Apply	CO 4
2.	Summarize the features of PROFIBUS.	BTL-2	Understand	CO 4
3.	Give the advantages of Foundation Field Bus.	BTL-2	Understand	CO 4
4.	List any two applications of MODBUS and PROFIBUS.	BTL-1	Remember	CO 4
5.	Summarize the benefits of Foundation Fieldbus over HART.	BTL-2	Understand	CO 4
6.	List the sub layers in the application layer of Foundation Field Bus.	BTL-1	Remember	CO 4
7.	Give the disadvantages of Field bus, compared to ±20 mA analog HART standard.	BTL-2	Understand	CO 4
8.	Define communication object.	BTL-1	Remember	CO 4
9.	Draw the PROFIBUS protocol stack.	BTL-3	Apply	CO 4
10.	Discover the common problems that occur with Modbus.	BTL-3	Apply	CO 4
11.	Write the applications of FMS, DP and PA PROFIBUS.	BTL-6	Create	CO 4
12.	Specify the transmission modes in which data is exchanged using MODBUS communication Protocol.	BTL-4	Analyze	CO 4
13.	What are the data transmission services defined in profibus?	BTL-1	Remember	CO 4
14.	List the various diagnostic tools available for troubleshooting in PROFIBUS.	BTL-1	Remember	CO 4
15.	Evaluate the main task of lower layer interface in Profibus protocol.	BTL-5	Evaluate	CO 4
16.	Point out the features of MODBUS communications.	BTL-4	Analyze	CO 4
17.	State the MODBUS message frame format with size of each field.	BTL-6	Create	CO 4
18.	List the contents in the structure of object dictionary which is used as communication object in PROFIBUS station.	BTL-5	Evaluate	CO 4
19.	Inspect, which is the preferred MODBUS mode? Why?	BTL-4	Analyze	CO 4

20.	What is data highway?	BTL-1	Remember	CO 4
21.	Define PROFIBUS.	BTL-2	Understand	CO 4
22.	What are the function codes in MODBUS?	BTL-3	Apply	CO 4
23.	Analyze the data transmission services defined in Profibus.	BTL-5	Evaluate	CO 4
24.	Mention the limitations of MODBUS.	BTL-4	Analyze	CO 4
	PART – B			
1.	**(i)** Describe the MODBUS functions and message format with an application. **(7)** **(ii)** With neat sketch explain the structure of MODBUS protocol. **(6)**	BTL-1 BTL-4	Remember Analyze	CO 4
2.	**(i)** Briefly explain the features of MODBUS. **(6)** **(ii)** Discuss the common problems and faults related to MODBUS installation. **(7)**	BTL-4	Analyze	CO 4
3.	Describe about Common MODBUS function code and Read coil code. **(13)**	BTL-1	Remember	CO 4
4.	**(i)** Discuss about the features of FIB-BUS in detail. **(7)** **(ii)** With neat sketch explain the foundation field bus in detail. **(6)**	BTL-2 BTL-4	Understand Analyze	CO 4
5.	Discuss about MODBUS protocol structure and function codes. **(13)**	BTL-2	Understand	CO 4
6.	**(i)** Discus about the MODBUS/TCP protocol. **(7)** **(ii)** List the different data types in MODBUS and explain each in detail. **(6)**	BTL-1	Remember	**CO 4**
7.	With neat sketch discuss the architecture of Profibus protocol stack. **(13)**	BTL-2	Understand	CO 4
8.	**(i)** Write short notes on classification of Profibus. **(6)** **(ii)** Explain in detail about troubleshooting tools helpful in identifying Profibus communication problems. **(7)**	BTL-4	Analyze	CO 4
9.	Explain the various layers of Profibus protocol stack. **(13)**	BTL-5	Evaluate	CO 4
10.	What is Profibus protocol stack? Explain with suitable diagram. **(13)**	BTL-2	Understand	CO 4
11.	With respect to MODBUS protocol, elaborate the following function codes with associated example for request message and response frame formats. **(i)** Read Coil Status (function code 01) **(4)** **(ii)** Preset Single Register (function code 06) **(3)** **(iii)** Loop Back Test (function code 08) **(3)** **(iv)** Force Multiple Register (function code 10) **(3)**	BTL-1	Remember	CO 4
12.	Classify the types of function codes in Modbus and explain in detail about read digital input status. **(13)**	BTL-3	Apply	CO 4
13.	List different types of layers in Profibus and explain each in detail. **(13)**	BTL-3	Apply	CO 4
14.	Design the various types of layers in Data Highway in detail. **(13)**	BTL-6	Create	CO 4
15.	What is communication object? Explain in detail the system operation of Profibus. **(13)**	BTL-2	Understand	CO 4
16.	Describe the Profibus communication model depicting the structure of virtual field device with object dictionary. **(13)**	BTL-3	Apply	CO 4
17.	Explain in detail about data highway protocol with neat diagram. **(13)**	BTL-5	Evaluate	CO 4
	PART-C			

1.	Elaborate in detail the various layers used in Foundation Field bus. **(15)**	BTL-5	Evaluate	CO 4
2.	Elaborate in detail the architecture of Foundation Field bus and give explanation on any of the five blocks. **(15)**	BTL-6	Create	CO 4
3.	**(i)** Compare the features of FF with Profibus. **(8)** **(ii)** Explain the installation and troubleshooting of Profibus. **(7)**	BTL-5	Evaluate	CO 4
4.	Discuss in detail about system operation of PROFIBUS and classification of PROFIBUS. **(15)**	BTL-6	Create	CO 4
5.	List the three OSI layers used in data highway protocol. Summarize the symbols, type and description for full duplex type of same protocol. **(15)**	BTL-5	Evaluate	CO 4

UNIT V- INDUSTRIAL ETHERNET AND WIRELESS COMMUNICATION

Industrial Ethernet, Introduction, 10 Mbps Ethernet, 100 Mbps Ethernet - Radio and wireless communication, Introduction, components of radio link - radio spectrum and frequency allocation – radio MODEMs-Introduction to wireless HART and ISA100.

PART – A

Q.No.	Questions	BT Level	Competence	Course Outcome
1.	Expand the following. (a) PTT (b) RSSI	BTL-1	Remember	CO 5
2.	Give the advantages of 'spread spectrum' radio modem.	BTL-2	Understand	CO 5
3.	Point out the common standard Ethernet implementations.	BTL-4	Analyze	CO 5
4.	Differentiate radio and wireless communication.	BTL-4	Analyze	CO 5
5.	Evaluate the baud rate of the standard 10-Mbps Ethernet.	BTL-5	Evaluate	CO 5
6.	State the purpose of ISA 100 committee.	BTL-4	Analyze	CO 5
7.	Evaluate the function of modem.	BTL-5	Evaluate	CO 5
8.	Examine the specifications of 10 Mbps and 100 Mbps Ethernet.	BTL-3	Apply	CO 5
9.	Give the advantages of radio waves.	BTL-2	Understand	CO 5
10.	What is meant by 10 Base T systems?	BTL-1	Remember	CO 5
11.	Examine RSSI in radio modem.	BTL-3	Apply	CO 5
12.	Classify the components of a radio link.	BTL-3	Apply	CO 5
13.	What is 5-4-3-2 rule in Ethernet?	BTL-1	Remember	CO 5
14.	Give the types of cables used in communication system.	BTL-2	Understand	CO 5
15.	Define 'Round trip delay'.	BTL-1	Remember	CO 5
16.	Discuss about the modes and features of radio modem.	BTL-2	Understand	CO 5
17.	Write the steps for implementing radio link.	BTL-6	Create	CO 5
18.	Justify the need for wireless communication in industries.	BTL-6	Create	CO 5
19.	What is 'Inter modulation'?	BTL-1	Remember	CO 5
20.	Write the features of industrial Ethernet. And also list the different connectors	BTL-1	Remember	CO 5

	used for industrial Ethernet.			
21.	What are delays in 100 base T network?	BTL-2	Understand	CO 5
22.	Mentation the magnitude of signal in Ethernet.	BTL-3	Apply	CO 5
23.	Asses the various functions of ISA100.	BTL-5	Evaluate	CO 5
24.	Evaluate the function of wireless HART.	BTL-4	Analyze	CO 5
	PART – B			
1.	Describe the modem hardware used for modulation and demodulation with a neat diagram. **(13)**	BTL-2	Understand	CO 5
2.	Describe 10 Base-5 Ethernet in detail with neat diagram. **(13)**	BTL-1	Remember	CO 5
3.	**(i)** Illustrate about wireless technologies based on channel rate, transmit power and range. **(7)** **(ii)** Explain the components of radio links and radio modems. **(6)**	BTL-3	Apply	CO 5
4.	Elaborate in detail the 10 Base-2 Ethernet in detail with neat diagram. **(13)**	BTL-5	Evaluate	CO 5
5.	Infer the range of frequency bands of radio transmission and give its applications. **(13)**	BTL-4	Analyze	CO 5
6.	Examine the detail the 10 Base-T Ethernet in detail with neat diagram.**(13)**	BTL-3	Apply	CO 5
7.	Brief the topology, cabling, media access and collision detection schemes of Ethernet Communication. **(13)**	BTL-1	Remember	CO 5
8.	Describe 100 Mbps Ethernet with its specifications in brief. **(13)**	BTL-1	Remember	CO 5
9.	**(i)** Distinguish between the IEEE 802.3 and Ethernet V2. **(7)** **(ii)** Discuss about the MAC Frame format. **(6)**	BTL-2	Understand	CO 5
10.	Describe about IEEE 802.3 standard Frame format. **(13)**	BTL-1	Remember	CO 5
11.	**(i)** Explain how a radio path profile is created while implementing a radio link. **(7)** **(ii)** Explain the modes and features of radio MODEM in detail. **(6)**	BTL-6	Create	CO 5
12.	Discuss in detail about the components of radio link with neat sketch. **(13)**	BTL-2	Understand	CO 5
13.	Draw the schematic of radio modem configuration and explain in detail. **(13)**	BTL-4	Analyze	CO 5
14.	Explain about the technical details of wireless HART communication standard in detail. **(13)**	BTL-4	Analyze	**CO 5**
15.	Write short notes on radio spectrum and frequency allocation. **(13)**	BTL-2	Understand	CO 5
16.	Explain 100 Mbps Ethernet media system with neat diagram. **(13)**	BTL-3	Apply	CO 5
17.	Explain in detail about wireless HART and ISA100 with neat diagram. **(13)**	BTL-5	Evaluate	CO 5
	PART – C			
1.	Discuss the features of industrial Ethernet and comment on its superiority over standard Ethernet. **(15)**	BTL-6	Create	CO 5
2.	**(i)** Write short notes on ISA 100. **(8)** **(ii)** Compare 10 Mbps Ethernet with 100 Mbps Ethernet in detail. **(7)**	BTL-5	Evaluate	CO 5
3.	Explain briefly about	BTL-5	Evaluate	CO 5

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	(i) Topology used in thick and thin Ethernet. **(8)** **(ii)** Connectors used in industrial Ethernet. **(7)**			
4.	Explain in detail about 10 Base-5, 10 Base-2, 10 Base-T and 10 Base-F Ethernet with its specifications . **(15)**	BTL-6	Create	CO 5
5.	Elaborate in detail about various 10Mbps Ethernet with neat diagram. **(15)**	BTL-6	Create	CO 5