Reg. No.															

Question Paper Code	13508

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Electrical and Electronics Engineering

20EEEL608 - INDUSTRIAL DATA COMMUNICATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Select the following which is considered a linear code for error detection? (a) CRC-16 (b) CRC-CCITT (c) Checksum (d) Cyclic code	1	K1	CO1
2.	Mention the primary characteristic of a digital signal? (a) It has continuous values (b) It has discrete states (c) It only exists in binary form (d)It is always used for encryption	1	K1	CO1
3.	Choose the main advantage of using the USB interface over traditional serial communication (RS-232)? (a) Faster data transfer rates (b) Simpler cable structure (c) Supports longer cable lengths (d) Uses less power	1	K1	CO2
4.	Which IEEE standard defines the physical layer for wireless local area networks (WLAN)? (a) IEEE 802.1 (b) IEEE 802.3 (c) IEEE 802.11 (d) IEEE 802.4	1	K1	CO2
5.	Tell the maximum transmission distance specified in the original RS-232(C) standard of 1968? (a) 25 feet (b) 100 feet (c) 50 feet (d) 9600 feet	1	K1	CO3
6.	What is a key difference between EIA/TIA 422 and EIA/TIA 423? (a) EIA/TIA 422 is unbalanced, while EIA/TIA 423 is balanced (b) EIA/TIA 422 supports higher speeds and multiple receivers, while EIA/TIA 423 operates at lower speeds (c) EIA/TIA 423 is used for high-speed Ethernet connections (d) EIA/TIA 422 requires grounding for proper operation	1	K1	CO3
7.	How do modern bridges improve network performance? (a) By converting Layer 2 addresses into IP addresses (b) By learning Layer 2 addresses and forwarding only necessary traffic. (c) By encrypting all data passing through them (d) By acting as a hub for all network traffic	1	K1	CO4
8.	Modbus RTU is primarily used for communication between : (a) Field devices only (b) Processors and a host (c) Web servers and browsers (d) Wireless IoT devices	1	K1	CO4
9.	Wireless HART is primarily used in: (a) Consumer IoT devices (b) Industrial automation and process control (c) Office networks (d) Vehicle-to-vehicle communication.	1	K1	CO5
10.	Linux is an open-source clone of_____. (a) Windows (b) UNIX (c) Mac OS (d) Android	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define channels, data and bits.	2	K1	CO1
12.	Compare serial and parallel transmission methods.	2	K2	CO1
13.	Write a short note on the data link layer.	2	K1	CO1

14.	Outline the advantages of EIA/TIA 530.	2	K2	CO2
15.	List out the high-speed serial hard disk interface.	2	K1	CO2
16.	State the difference between EIA 422 and EIA 485.	2	K1	CO2
17.	Classify the types of field buses.	2	K2	CO3
18.	Illustrate the relationship between OSI and Ethernet/IP.	2	K2	CO3
19.	Write down the different types of Modbus RTU messages.	2	K1	CO4
20.	Name the types of wireless communication technologies used in wireless SCADA systems and describe their roles in system operation.	2	K2	CO4
21.	Interpret the role of IEEE 802.15.4 in low-power wireless communication.	2	K2	CO5
22.	What are some of the factors that affect the battery life of sensor nodes in wireless sensor networks?	2	K1	CO5

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Compare the OSI model with the TCP/IP model in terms of structure and function.	11	K2	CO1
		OR			
	b)	With a neat diagram, explain in detail the serial and parallel transmission of data communication.	11	K2	CO1
24.	a)	Discuss about the EIA/TIA 485(A) standard by identifying its key features and illustrating its communication principles.	11	K2	CO2
		OR			
	b)	Outline about USB or PC serial communications by identifying their key features and illustrating their operational mechanisms.	11	K2	CO2
25.	a)	Build the concepts behind Allen-Bradley and Modicon PLC used for industrial systems.	11	K3	CO3
		OR			
	b)	Make use of HART and its concepts and explain with neat diagram.	11	K3	CO3
26.	a)	Infer the key technologies used in wide area communication, such as cellular networks, satellite communication and LoRaWAN.	11	K2	CO4
		OR			
	b)	Explain the role of communications security in wide-area SCADA systems.	11	K2	CO4
27.	a)	Demonstrate in detail about Zigbee module communication reliability and packet loss in noisy environments.	11	K2	CO5
		OR			
	b)	With a neat sketch, explain how sensor networks can be used to monitor and manage environmental conditions, such as air quality, water quality, and weather patterns.	11	K2	CO5
28.	a) (i)	Extend some limitations of using wireless SCADA in industrial applications.	6	K2	CO4
	(ii)	Mention the key hardware components of a wireless sensor network and brief its features.	5	K2	CO5
		OR			
	b)(i)	Interpret the Important components of Modbus RTU.	6	K2	CO4
	(ii)	Explain the salient features of Bluetooth.	5	K2	CO5