Reg. No.												

Question Paper Code	12163

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Sixth Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20EIPC601 - INDUSTRIAL COMMUNICATION NETWORKS

(Regulations2020)

Duration: 3 Hours Max. Marks: 100

PART-A (10 × 2 = 20 Marks)

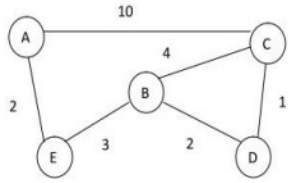
Answer ALL Questions

		Marks, K-Level, CO
1.	Define Computer Network.	*2,K1,CO1*
2.	Write the fundamental characteristics on which the effectiveness of data communication depends on.	*2,K2,CO1*
3.	What is ARPANET?	*2,K1,CO2*
4.	State the minimum delay between two consecutive RS232 frames.	*2,K1,CO2*
5.	Explain the two modes of communication modes of HART.	*2,K2,CO3*
6.	How can you connect or disconnect a field bus instrument from the bus without affecting the performance of the rest of the instruments?	*2,K2,CO3*
7.	Why no signal ground/reference wire is used in PROFIBUS cables?	*2,K2,CO4*
8.	What is the maximum transmission distance without repeaters? Which baud rate is supported at this maximum distance?	*2,K2,CO4*
9.	Differentiate between 'forward lookup' and 'reverse lookup' in DNS.	*2,K2,CO5*
10.	Define the term medium access control mechanism.	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	With a neat sketch explain the architecture of an OSI seven layer model.	*13,K2,CO1*
		OR	
	b)	How frame order and flow control is achieved using the data link layer?	*13,K2,CO1*
12.	a)	Explain in detail about the access method and frame format used in Ethernet and Token ring.	*13,K2,CO2*
		OR	
	b)	For the following network, develop the datagram for forwarding table for all the nodes. The links are labeled with relative costs. The tables should forward each packet via the least cost path to destination.	*13,K3,CO2*



13. a) Explain in detail about the use of wired connection to configure the join key & network id in wireless HART. *13,K2,CO3*

OR

b) Explain about the cause of an OPC interface to stop collecting data. *13,K2,CO3*

14. a) Explain with neat diagram about data stored in standard Modbus. *13,K2,CO4*

OR

b) How does a HART Assist commissioning and configuration for an Industrial automation application. *13,K2,CO4*

15. a) Determine the maximum distance between any pair of stations in a CSMA/CD network with a data rate of 10 Mbps, for the correct operation of collision detection process, assuming the frame size to be 512 bits. What should be the maximum distance, if the data rate is increased to 1 Gbps? Two stations A and B, connected to opposite ends of a 10-Mbps CSMA/CD network, start transmission of long frames at times $t_1 = 0$, and $t_2 = 3\mu s$ respectively. Determine the instants when A hears the collision and B hears the collision. Signal propagation speed may be assumed as 2×10^8 m/s. *13,K3,CO5*

OR

b) Show and explain the ARP packet format for mapping IP addresses to Ethernet addresses. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) My OPC client application periodically loses connectivity to the OPC server. When I check again, the connection works. How can I diagnose intermittent OPC communication problems? Explain in detail. *15,K3,CO3*

OR

b) Consider a bus LAN with a number of equally spaced stations with a data rate of 9 Mbps and a bus length of 1 km. What is the mean time to send a frame of 500 bits to another station, measured from the beginning of transmission to the end of reception? Assume propagation speed of 150 m/s.If two stations begin to monitor and transmit at the same time, how long does it need to wait before interference is noticed? *15,K3,CO1*