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B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Seventh Semester

18EIC402T - INDUSTRIAL DATA COMMUNICATION

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) — Answer **all** Questions

		Marks	BL	CO
1.	Which layer of the OSI model is responsible for addressing and routing data packets? (A) Physical Layer (B) Data Link Layer (C) Network Layer (D) Transport Layer	1	1	1
2.	What does TCP/IP stand for? (A) Transmission Control Protocol/Internet Protocol (B) Total Control Packet/Interconnect Protocol (C) Telecommunication Control Protocol/Internet Protocol (D) Transfer Control Protocol/Interlink Protocol	1	1	1
3.	In the OSI model, which layer is responsible for establishing, maintaining, and terminating connections between two devices? (A) Transport Layer (B) Presentation Layer (C) Session Layer (D) Application Layer	1	1	1
4.	Which organization developed the EIA-232 standard? (A) IEEE (B) ITU-T (C) EIA/TIA (D) ISO	1	1	1
5.	HART communication is commonly used in which industry? (A) Telecommunications (B) Healthcare (C) Process Automation and Control (D) Aerospace	1	1	2
6.	Which layer of the TCP/IP model is responsible for routing packets between different networks? (A) Network Layer (B) Transport Layer (C) Data Link Layer (D) Application Layer	1	1	2
7.	In HART communication, what is the purpose of the analog 4-20 mA signal? (A) To transmit digital data (B) To facilitate wired communication (C) To carry the primary process variable (D) To facilitate wireless communication	1	1	2
8.	Which layer of the OSI model is primarily associated with Fieldbus communication? (A) Physical Layer (B) Data Link Layer (C) Transport Layer (D) Application Layer	1	1	2
9.	What is PROFIBUS? (A) A type of industrial robot (B) A communication protocol used in industrial automation (C) A measurement unit for pressure in pipelines (D) A type of computer processo	1	1	3

10. Which organization is responsible for developing and maintaining the PROFIBUS standard? 1 1 3

(A) IEEE (B) ISA
(C) PROFIBUS International (D) OPC Foundation

11. What is the primary purpose of MODBUS in industrial automation? 1 1 3

(A) To control traffic signals (B) To communicate between industrial devices and sensors
(C) To regulate building heating and cooling systems (D) To facilitate online gaming

12. In MODBUS communication, what are the two primary communication modes? 1 1 3

(A) Serial and Parallel (B) RTU and ASCII
(C) Wired and Wireless (D) Analog and Digital

13. What is the primary purpose of Industrial Ethernet switches in a network? 1 1 4

(A) To translate between different communication protocols (B) To monitor network security
(C) To filter and forward network traffic efficiently (D) To provide wireless connectivity

14. Which sublayer of the Data Link Layer does IEEE 802.3 define?. 1 1 4

(A) Network sublayer (B) Physical sublayer
(C) LLC sublayer (D) MAC sublayer

15. What type of cable is commonly used in IEEE 802.3 Ethernet networks for Gigabit Ethernet connections? 1 1 4

(A) Serial cable (B) Twisted pair cable
(C) Fiber optic cable (D) Coaxial cable

16. What is the maximum data rate of 100BASE-T4 (Fast Ethernet over four pairs of Category 3 cable)? 1 1 4

(A) 10 Gbps (B) 1 Gbps
(C) 100 Mbps (D) 10 Mbps

17. What is a wireless sensor network (WSN)? 1 1 5

(A) A network of satellite communication devices (B) A network of battery-powered sensors that communicate wirelessly
(C) A network of interconnected smartphones (D) A network of wireless routers

18. What is Zigbee primarily designed for? 1 1 5

(A) Satellite communication (B) Mobile phone communication
(C) Home automation and industrial control applications (D) High-speed data transfer

19. What is the typical range of Zigbee communication in meters? 1 1 5

(A) Up to 10 kilometers (B) Up to 1 kilometer
(C) Up to 100 meters (D) Up to 10 meters

20. What is the primary goal of ISA 100? 1 1 5

(A) To define communication protocols for social media platforms (B) To create a standard for video game consoles
(C) To provide secure and reliable wireless communication in industrial settings (D) To standardize programming languages

PART - B (5 × 4 = 20 Marks) Marks BL CO

Answer **any 5** Questions

21.	Write short notes on EIA-232 interface standard	4	2	1
22.	Discuss about the Standard ETHERNET Configuration	4	1	1
23.	Write short notes on Digital Frequency Shift Keying (FSK) in Hart protocol	4	2	2
24.	Describe the functions of Data Link and Physical layer of Field Bus	4	2	2
25.	Summarize the key points of protocol stack	4	1	3
26.	Write the Differences between IEEE 802.3 and Blue Book Ethernet (V2)	4	1	4
27.	What are the Hardware components of Wireless sensor networks	4	1	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Explain in detail about OSI layer protocol	12	2	1
	(OR)			
	(b) Discuss in detail about the TCP/IP protocol			
29.	(a) Elaborate on the significance of HART protocol	12	2	2
	(OR)			
	(b) Explain in detail about the Field Bus			
30.	(a) Provide a detailed overview of Profibus	12	2	3
	(OR)			
	(b) Explain in detail about MOD Bus			
31.	(a) Elaborate on the significance of 10Base5, 10Base2, 10BaseT	12	2	4
	(OR)			
	(b) Provide a detailed overview of IEEE 802.2 LLC			
32.	(a) Explain in detail about Wireless sensor networks components and architecture.	12	2	5
	(OR)			
	(b) Provide a detailed overview of Zigbee Wireless HART.			

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