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Question Paper Code	13634
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Instrumentation and Control Engineering

20ICPC601 - INDUSTRIAL DATA NETWORKS

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

	Marks	K – Level	CO
1. TCP divides a stream of data into smaller units called _____ (a) Frames (b) Packets (c) Segments (d) Datagrams	1	K1	CO1
2. At the _____ the main protocol defined by TCP/IP is the Internetworking Protocol (a) Network layer (b) Transport layer (c) Application layer (d) Presentation layer	1	K1	CO1
3. A DeviceNet network may have upto _____ media access control identifiers or MAC ID's. (a) 8 (b) 16 (c) 32 (d) 64	1	K1	CO2
4. _____ protocol has fast response and high reliability for applications as demanding as control of anti-lock brakes and air-bags. (a) Local Area Network (b) Process Control Network (c) Controller Area Network (d) Wide Area Network	1	K1	CO2
5. The ultimate goal of a unified network is to achieve _____ after due testing and certification of field devices and systems. (a) Interoperability (b) Interchangeability (c) Interproductivity (d) Interreliability	1	K1	CO3
6. The _____ combines the functionality of the existing OPC interfaces with new technologies such as XML and Web Services to deliver higher level MES and ERP support (a) OPC specification (b) OPC standard (c) OPC Foundation (d) OPC Unified Architecture	1	K1	CO3
7. The Foundation data highway standard permits up to _____ devices before a repeater in the highway must be used. (a) 8 (b) 16 (c) 24 (d) 32	1	K1	CO4
8. With ProfiBus, all parameters of a device are specified in a so called _____ file, which is the electronics data sheet of the device. (a) GSD (b) JPG (c) TIF (d) PNG	1	K1	CO4
9. The _____ is responsible to route the data packets from one subnet over the backbone network to its destination, which can be another subnet or the gateway. (a) Backbone router (b) Gateway (c) System manager (d) Security manager	1	K1	CO5
10. _____ is used for flow control and therefore should not be set too low; otherwise, the buffer on the receiver will overflow. (a) Host data rate (b) Radio channel data rate (c) Supervisory data channel rate (d) Flow control rate	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. Define Industrial Data Network.	2	K1	CO1
12. Name any four important Data Link Layer Protocols.	2	K1	CO1
13. Mention the advantages and Disadvantages of Local Area Network.	2	K1	CO1

14. Differentiate Hub, Switch and Routers.	2	K2	CO2
15. Point out the limitations of RS-232.	2	K2	CO2
16. Tabulate the AS-i Sensor Network Characteristics.	2	K2	CO2
17. Distinguish between interchangeability and interoperability.	2	K2	CO3
18. List the HART commands.	2	K1	CO3
19. Summarize the benefits of Foundation Field bus over HART.	2	K2	CO4
20. Classify the types of PROFIBUS.	2	K2	CO4
21. Give the types of cables used in communication system.	2	K1	CO5
22. Explain the function of modem.	2	K2	CO5

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) Explain CSMA/CD and CSMA/CA protocols and its operation in detail.	11	K2	CO1
OR			
b) Write short notes on TCP/IP layer protocol. Also compare TCP/IP with OSI.	11	K2	CO1
24. a) (i) Summarize the concept of Hub and Switch.	6	K2	CO2
(ii) Explain the importance of Routers in an internet.	5	K2	CO2
OR			
b) (i) Tabulate the difference between the RS 232 and RS 485 standard.	6	K2	CO2
(ii) Describe about the communication used in RS 232.	5	K2	CO2
25. a) With neat sketch explain the general FIELDBUS architecture.	11	K2	CO3
OR			
b) Discuss about the HART Protocol implementation of OSI layer Model.	11	K2	CO3
26. a) With neat sketch explain the structure of MODBUS protocol.	11	K2	CO4
OR			
b) Describe about Common MODBUS function code and Read coil code.	11	K2	CO4
27. a) Explain the topology used in the Ethernet.	11	K2	CO5
OR			
b) Describe 100 Mbps Ethernet with its specifications in brief.	11	K2	CO5
28. a) (i) Explain the different data types in MODBUS and explain each in detail.	6	K2	CO4
(ii) Summarize the cabling requirement of thin Ethernet.	5	K2	CO5
OR			
b) (i) Outline the error detection in PROFIBUS.	6	K2	CO4
(ii) Compare 10 Mbps Ethernet with 100 Mbps Ethernet in detail.	5	K2	CO5