

Code No: 158EV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech IV Year II Semester Examinations, June - 2024****INDUSTRIAL IOT****(Computer Science and Engineering (IOT))****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Name two key technologies driving the adoption of the Industrial Internet. [2]
- b) Discuss three key opportunities and benefits offered by the Industrial Internet. [3]
- c) Explain the concept of IP Mobility in the context of the Industrial Internet. [2]
- d) Explain the significance of Cloud and Fog Computing in the Industrial IoT. [3]
- e) Explain the concept of Industrial Internet Viewpoints. [2]
- f) Discuss the significance of key system characteristics such as reliability, scalability, and interoperability in IIoT deployments. [3]
- g) What are legacy industrial protocols, and why are they still used in industrial systems? [2]
- h) Discuss the challenges associated with legacy industrial protocols. [3]
- i) Explain the role of middleware architecture in Industrial Internet systems. [2]
- j) Describe the components of middleware architectures. [3]

PART – B**(50 Marks)**

- 2.a) Compare and contrast the innovation potential of IIoT in manufacturing and retail sectors, highlighting key differences in use-cases and challenges.
- b) Explore the role of edge computing in the Industrial Internet, and discuss its significance. [5+5]

OR

- 3.a) Explain how the Industrial Internet facilitates predictive maintenance in industrial machinery.
 - b) Discuss the ethical and privacy concerns associated with the use of Industrial Internet technologies. [5+5]
- 4.a) Describe the role of Big Data in the Industrial Internet.
 - b) Explore the challenges associated with implementing Network Virtualization in Industrial Internet environments. [5+5]

OR

- 5.a) Discuss the potential impact of IP Mobility on industrial automation and mobility management in IIoT environments.
- b) Discuss the ethical considerations of using Artificial Intelligence in Industrial Internet applications. [5+5]

- 6.a) Discuss the role of advanced data analytics in IIoT.
b) Evaluate the importance of data governance and regulatory compliance in IIoT data management. [5+5]

OR

- 7.a) Analyze real-world IIoT reference architectures and case studies. Identify common patterns, best practices, and lessons learned from successful IIoT implementations.
b) Explore the integration of Machine Learning and AI techniques into IIoT architectures. [5+5]

- 8.a) Discuss the characteristics of Wi-Fi and LoRaWAN as wireless communication technologies in Industrial Internet systems.
b) Discuss the challenges of interoperability between different communication protocols in Industrial Internet systems. [5+5]

OR

- 9.a) Explore the features and benefits of CoAP (Constrained Application Protocol) in Industrial Internet systems.
b) Analyze the role of gateways in facilitating communication between wireless sensor networks (WSNs) and cloud platforms in Industrial Internet systems. [5+5]

- 10.a) Compare and contrast MQTT, XMPP, AMQP, and DDS messaging protocols in terms of their characteristics, advantages, and use-cases in Industrial Internet applications.
b) Explore the concept of real-world smart factories and their application in Industrial Internet systems. [5+5]

OR

11. Describe the middleware architecture used in IIoT systems, including message brokers, data storage, and communication protocols. [10]

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