Total No. of Questions : 8]

SEAT No. :

PB-2497

[Total No. of Pages : 3

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B.E. (Artificial Intelligence and Data Science)

INDUSTRIAL INTERNET OF THINGS

(2019 Pattern) (Semester - VII) (Elective - III) (417523(B))

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q. 6, Q.7 or Q. 8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Define Industrial Internet of Things (IIoT). List and briefly explain the components of IIoT architecture. **[8]**

b) Draw and explain the Reference Architecture of IIoT. **[5]**

c) Explain the integration of Wireless Sensor Networks (WSN) into the IIoT architecture. **[5]**

OR

Q2) a) Discuss the Industrial Internet Architecture Framework (IIAF). Explain its purpose, key principles and how it guides the design and implementation of IIoT systems. **[10]**

b) Discuss the layers of Industrial IoT (IIoT) architecture. Describe the functionalities and interactions within each layer, focusing on (any 3): **[8]**

i) IIoT Sensing
ii) IIoT Processing
iii) IIoT Communication
iv) IIoT Networking

Q3) a) Compare and contrast the following IIoT cloud platforms w.r.t their features, capabilities and suitability for different industrial applications: **[8]**

i) Cloud of Things (COT) platforms
ii) Predix
iii) PTC ThingWorx
iv) Microsoft Azure

P.T.O.

b) Describe various data visualization techniques commonly used in Industrial IoT (IIoT) applications. Explain how these techniques help in representing complex data sets visually for better understanding and analysis. **[6]**

c) Differentiate between Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS), providing examples for each. **[3]**

OR

Q4) a) Discuss the role of Data Analytics in optimizing Industrial IoT (IIOT) systems. Explain how data analytics techniques can extract valuable insights from IIoT-generated data to improve efficiency, predictive maintenance and decision-making processes. **[10]**

b) Explain the concept of Digital Twin in the context of Industrial IoT (IIoT). Discuss the need for Digital Twin technology and its benefits in industrial settings. **[7]**

Q5) a) Explain the importance of security in Industrial IoT (IIoT) deployments. Discuss the potential consequences of security breaches in IoT systems and their impact on industrial operations. **[10]**

b) Discuss the management aspects of cybersecurity in Industrial IoT (IIoT) environments. Explain the roles and responsibilities of stakeholders in managing IIoT security risks and implementing effective cybersecurity policies and procedures. **[7]**

OR

Q6) a) Explain the concept of access control in Industrial IoT (IIoT) environments. Discuss the mechanisms and techniques used to enforce access control policies and permissions in IIoT systems. **[10]**

b) Discuss the importance of identity establishment in IIoT security. Explain the methods and protocols used to establish and manage identities for IIoT devices and users. **[7]**

Q7) a) Explain Smart Logistics and its impact on supply chain management. **[6]**

b) Describe Smart Irrigation and its benefits in agricultural practices. **[6]**

c) Discuss the characteristics and design principles of Industry 4.0. **[6]**

OR

Q8) a) Define Cyber Manufacturing Systems and discuss their importance in modern manufacturing. **[6]**

b) Explain the role of IoT in the Healthcare Service Industry and provide examples of IoT-enabled healthcare solutions. **[6]**

c) Introduce the concept of Industry 5.0 (Society 5.0) and discuss its potential impact on society. **[6]**