17773

BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Tech.(RA)-2024
Course Name – Industrial Internet of Things
Course Code - MEC20107
(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Which of the following best describes the First Industrial Revolution?
   a) Mass production and assembly lines
   b) Introduction of water and steam power
   c) Use of electronics and IT systems
   d) Automation and data exchange

(ii) Analyze the key factor that differentiates IIoT from traditional industrial automation.
   a) Use of programmable logic controllers
   b) Real-time data exchange and connectivity
   c) Manual monitoring with sensors
   d) Standalone systems

(iii) In a smart factory, analyze why predictive maintenance outperforms reactive maintenance.
   a) Reduces unplanned downtime
   b) Increases manual inspections
   c) Minimizes automation
   d) Requires human intervention

(iv) Analyze the reason for integrating cybersecurity frameworks into IIoT networks.
   a) Reduces operational efficiency
   b) Protects against data breaches
   c) Disables machine connectivity
   d) Increases manual data handling

(v) Analyze the trade-offs between using wired and wireless sensor networks in industrial automation.
   a) Wired networks provide better security, while wireless networks offer flexibility
   b) Wireless networks are always faster
   c) Wired networks consume less power
   d) Wireless networks are more reliable

(vi) Identify the key role of embedded PCs in IIoT.
   a) Sending emails
   b) Managing cloud storage
   c) Processing real-time data
   d) Running office applications

(vii) Name the IIoT platform commonly used for industrial automation.

a) Google Drive b) Microsoft Azure IoT Hub
c) YouTube d) Instagram

(viii) Identify, which feature of an IoT Gateway enhances its security.

a) Data compression b) End-to-end encryption
c) Increased power consumption d) Direct database storage

(ix) Tell, which type of device is considered an IoT Edge device.

a) Cloud server b) Smart sensor
c) Mainframe computer d) Wi-Fi router

(x) Indicate, the main advantage of using edge computing in IIoT.

a) Reduces latency and bandwidth usage b) Eliminates the need for cloud computing
c) Increases cloud storage costs d) Requires less processing power

(xi) Identify, what type of graphs are commonly used in IIoT dashboards.

a) Bar charts b) Line graphs
c) Heatmaps d) All of the above

(xii) Explain, why data filtering is necessary in IIoT dashboards.

a) To reduce unnecessary data noise b) To increase data storage requirements
c) To slow down processing speeds d) To replace cloud-based analytics

(xiii) Identify the industry that benefits from PLM software

a) Automotive b) Aerospace
c) Healthcare d) All of the above

(xiv) Indicate the main advantage of IoT in power plants

a) Increased power outages b) Reduced automation
c) Increased operational costs d) Improved energy efficiency

(xv) A company wants to reduce energy costs using IoT. Choose the preferred solution in this context

a) Smart meters and automated HVAC control b) Manual temperature monitoring
c) Reducing IoT device usage d) Using paper-based records

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Describe the major components of an IoT hub system. (3)
3. Illustrate the key features of a good IIoT dashboard. (3)
4. Explain the significance of smart sensors in Cyber-Physical Systems. (3)
5. Define remote health monitoring using IIoT. (3)
6. Illustrate the main benefits of Industry 4.0. (3)

OR

Compare IIoT and traditional SCADA systems. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe the four industrial revolutions in detail. (5)

8. List and describe five types of actuators used in IIoT. (5)
9. Analyze the impact of IIoT in modern industrial automation. (5)
10. Explain how next-generation sensors improve industrial automation. (5)
11. Explain the advantages of RFID and barcode scanning in inventory management. (5)
12. Explain the concept of Industrial IoT (IIoT) with its key components. (5)

OR

Explain the benefits and challenges of IIoT adoption in industries. (5)

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