BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – M.Tech.(RA)-2025
Course Name – Industrial Automation
Course Code - MEC20406
(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) Select the main feature of the Second Industrial Revolution.
a) Cyber-physical systems b) Electricity-based mass production
c) Smart sensors d) Cloud computing

(ii) Represent the core idea of Industry 4.0 implementation.
a) Manual control b) Standalone machines
c) Cyber-physical integration d) Mechanical relays

(iii) Predict the primary role of IoT in industrial systems.
a) Increased manual work b) Real-time data connectivity
c) Reduced sensing d) Offline control

(iv) Identify the function of smart sensors in smart factories.
a) Data storage only b) Real-time monitoring
c) Manual inspection d) Power isolation

(v) Determine the Industry 4.0 element used for virtual system simulation.
a) PLC b) Digital twin
c) Relay logic d) Pneumatics

(vi) Choose the sensor suitable for temperature measurement in industrial processes.
a) LVDT b) Thermocouple
c) Proximity sensor d) Encoder

(vii) Differentiate sensors and actuators based on system function.
a) Both measure b) Input vs output devices
c) Both control motion d) Both store data

(viii) Differentiate Bluetooth and LoRa based on communication range.
a) Same range b) Short vs long range
c) Wired vs wireless d) Analog vs digital

(ix) Identify the role of data analytics in predictive maintenance.

a) Random inspection
b) Failure prediction
c) Manual servicing
d) Signal generation

(x) Select the communication direction handled by an IoT Gateway.

a) Sensor-to-actuator only
b) Device-to-cloud
c) Mechanical-to-electrical
d) Power-to-signal

(xi) Estimate downtime reduction using predictive maintenance analytics.

a) Increase
b) No change
c) Reduction
d) Shutdown

(xii) Select the expected performance change when data processing shifts to edge systems.

a) Decrease
b) No change
c) Increase
d) Failure

(xiii) Predict the impact of AI-driven analytics on manufacturing quality.

a) Degradation
b) Improvement
c) No change
d) Elimination

(xiv) Identify the industrial application of next generation vision sensors.

a) Power control
b) Quality inspection
c) Energy storage
d) Heat dissipation

(xv) Select the appropriate platform for lifecycle-wide product collaboration.

a) Standalone CAD
b) PLM system
c) Spreadsheet
d) Paper files

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Evaluate the importance of automated assembly system types in manufacturing. (3)
3. Write the steps involved in implementing an Automated Guided Vehicle (AGV) system. (3)
4. Discuss different LCU security design approaches. (3)
5. Discuss the advantages of using machine vision over contact inspection methods. (3)
6. Analyze the differences between various PLC programming languages. (3)

OR

Compare the advantages of using RFID over barcode for automatic identification in process industries. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe the principles and strategies of automation in production systems. (5)
8. Compare flexible manufacturing systems (FMS) with cellular manufacturing. (5)
9. Analyze the safety features of PLCs with examples from case studies. (5)
10. Illustrate and explain different LCU security design approaches. (5)
11. Evaluate the effectiveness of using CMM and machine vision together in quality control. (5)
12. Compare work-in-process storage and finished goods storage in automated systems. (5)

OR

Conclude the benefits of integrating automatic identification methods (barcode/RFID) in material handling. (5)

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