



42038

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Tech.(RA)-2023

Course Name – Industrial Robotics and Automation

Course Code - PCC-ECR602

(Semester VI)

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) Identify the primary function of an industrial robot in material handling.

- | | |
|-------------|-------------------|
| a) Welding | b) Painting |
| c) Assembly | d) Transportation |

(ii) Indicate type of industrial robot that commonly used for material handling in confined spaces.

- | | |
|----------------|--------------|
| a) SCARA | b) Cartesian |
| c) Articulated | d) Delta |

(iii) In material handling applications, select the purpose of an end-effector.

- | | |
|-------------------------------------|-------------------------------------|
| a) Powering the robot | b) Sensing environmental conditions |
| c) Gripping or manipulating objects | d) Providing vision capabilities |

(iv) Select that object recognition and categorization in robotic vision systems often rely on:

- | | |
|-----------------------------|---|
| a) Deep learning algorithms | b) Traditional computer vision techniques |
| c) Hardware components only | d) Laser scanning |

(v) Indicate the technique that is commonly used for depth measurement in robotic vision systems.

- | | |
|------------------|----------------------|
| a) Stereo vision | b) Image compression |
|------------------|----------------------|

- c) Histogram equalization
- d) Morphological operations
- (vi) Select the primary goal of material handling.
 - a) Maximizing warehouse space
 - b) Minimizing labor costs
 - c) Improving operational efficiency
 - d) Reducing equipment maintenance
- (vii) Choose Industrial trucks that are commonly used for which type of material handling.
 - a) Long-distance transport
 - b) High-speed conveyance
 - c) Small part picking
 - d) Bulk material movement
- (viii) Identify Conveyor systems that are ideal for:
 - a) Irregularly shaped items
 - b) Batch processing
 - c) Low-volume production
 - d) Continuous flow of materials
- (ix) Select the reason of using Cranes and hoists.
 - a) Small parts assembly
 - b) Vertical material movement
 - c) Horizontal transport
 - d) Inventory tracking
- (x) Select the reason of using Bar code technology.
 - a) Real-time location tracking
 - b) Inventory identification and tracking
 - c) Automated material inspection
 - d) Equipment maintenance scheduling
- (xi) Identify the factor that is not a consideration in material handling systems design.
 - a) Safety of personnel and equipment
 - b) Cost-effectiveness
 - c) Maximum complexity for enhanced performance
 - d) Operational efficiency
- (xii) Identify a common challenge in conventional material handling systems.
 - a) Limited energy efficiency
 - b) Incompatibility with automation
 - c) Low reliability
 - d) Insufficient load capacity
- (xiii) RFID technology distinguishes from bar codes primarily in terms of:
 - a) Cost-effectiveness
 - b) Data storage capacity
 - c) Line-of-sight requirements
 - d) Communication range and capabilities
- (xiv) Select a characteristic of advanced material handling systems
 - a) Manual operation
 - b) Minimal automation
 - c) Complex integration of technologies
 - d) Low scalability
- (xv) Choose a technology that is used for real-time tracking of inventory within a warehouse.
 - a) AGV systems
 - b) RFID
 - c) ASRS
 - d) Bar code

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Describe the importance of material handling in industrial operations. (3)
3. State the Law's of Robotics. (3)
4. Illustrate image representation for robotic vision systems. (3)
5. Describe safety considerations that have an impact on robot selection. (3)
6. Explain the impact of external forces, such as gravity and inertial forces on gripper force analysis. (3)

OR

Analyse the design of grippers with multiple degrees of freedom to enhance manipulation capabilities. (3)

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Explain that robots impact supply chain management, logistics, and distribution operations. (5)
8. Explain the key applications of robots in underwater environments, and how do they facilitate operations. (5)
9. Discuss sensors of a Robot. (5)
10. Explain the role that friction plays in gripper force analysis. (5)
11. Explain how external forces such as gravity and inertial forces impact gripper force analysis and design. (5)
12. Focus role that does scalability and future-proofing play in the economic rationale for robotization. (5)

OR

Explain that robots contribute to productivity gains and operational efficiencies in industries. (5)
