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INDUSTRIAL ROBOTICS AND DIGITAL MANUFACTURING TECHNICIAN

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UNIT WISE MCQ QUESTIONS WITH ANSWER EXPLANATION

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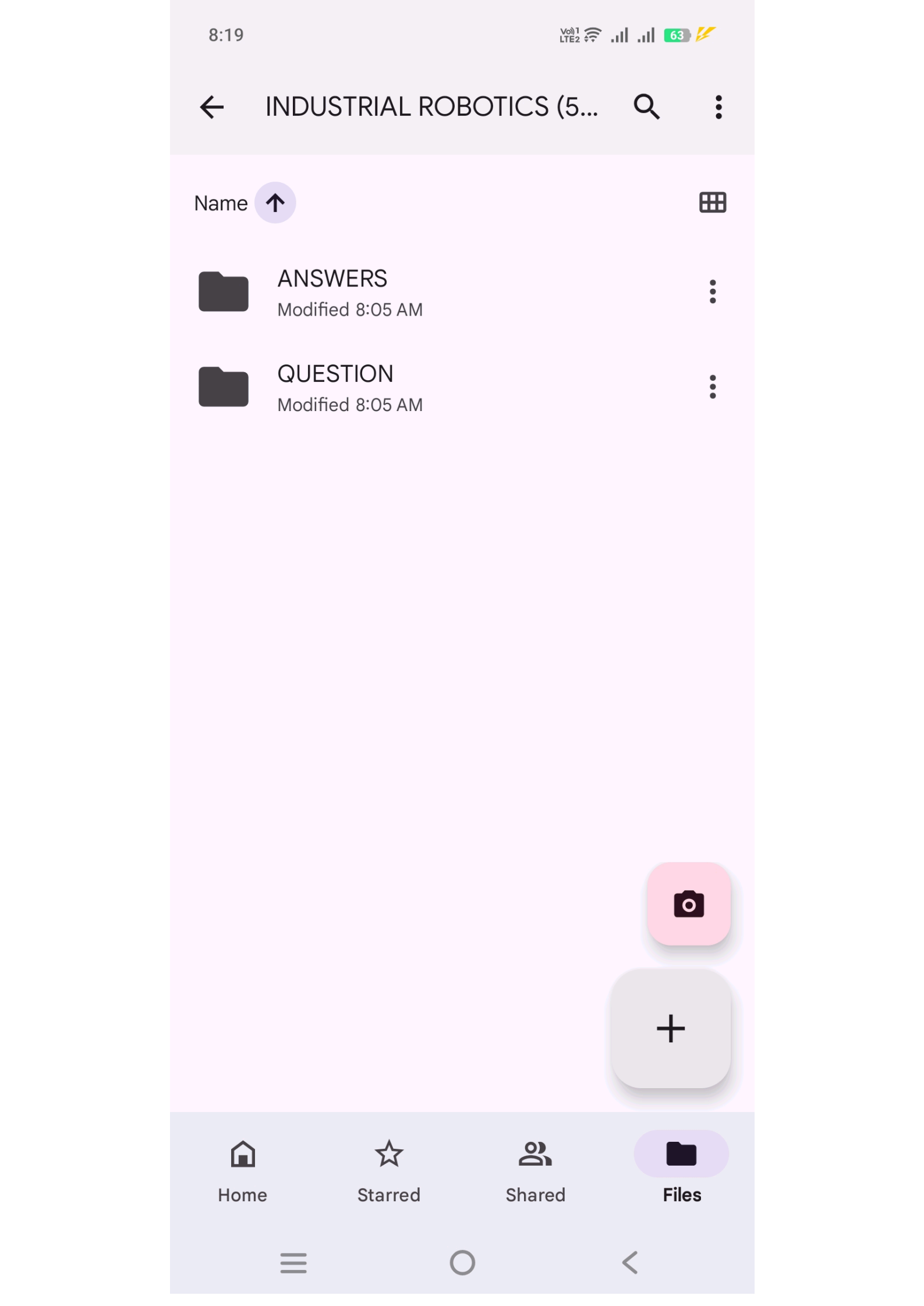
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UNIT 01: GENERAL SAFETY PRECAUTION AND FIRST AID

IMPORTANCE OF SAFETY

QUESTION

1: What is the primary purpose of workplace safety protocols?

A) To increase production speed

B) To reduce operational costs

C) To prevent accidents and injuries

D) To enhance product quality

2: What does the term "hazard" refer to in a workplace context?

A) A scheduled break times

B) A potential source of harm or adverse health effect

C) A type of personal protective equipment

D) A safety training session

3: Under which condition should a "lockout/tagout" procedure be implemented?

A) During lunch breaks

B) When cleaning office areas

C) When servicing or maintaining machinery

D) During employee meetings

4: Which assumption is incorrect regarding personal protective equipment (PPE)?

A) PPE eliminates all hazards

B) PPE reduces exposure to hazards

C) PPE should be used when hazards cannot be eliminated

D) PPE must be properly maintained

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5: Which of the following is a characteristic of a safe workplace?

A) Cluttered walkways

B) Poor lighting

C) Regular safety training sessions

D) Unlabelled chemical containers

6: What is the primary goal of first aid?

A) To diagnose illnesses

B) To provide long-term treatment

C) To preserve life and prevent the condition from worsening

D) To replace professional medical care

5: Which of the following is a characteristic of a safe workplace?

A) Cluttered walkways

B) Poor lighting

6: What is the primary goal of first aid?

A) To diagnose illnesses

B) To provide long-term treatment

C) To preserve life and prevent the condition from worsening

D) To replace professional medical care

7: What does CPR stand for?

A) Critical Patient Recovery

B) Cardiopulmonary Resuscitation

C) Complete Physical Rehabilitation

D) Cardiac Pulse Restoration

8: When should you not move an injured person?

A) When they are in a safe environment

B) If they are unconscious

C) If you suspect a spinal injury

D) When they request to be moved

9: Which assumption is incorrect regarding bleeding control?

A) Applying pressure can help stop bleeding

B) Elevating the injured area reduces blood flow

C) Tourniquets should be the first method used

D) Clean cloth can be used to apply pressure

10: Which of the following is a characteristic of shock in an injured person?

A) Warm, dry skin

B) Rapid pulse

C) High blood pressure

D) Slow breathing

11: What is the primary purpose of PPE?

A) To enhance employee appearance

B) To increase work speed

C) To protect workers from hazards

D) To identify employees

12: What does PPE stand for?

A) Professional Protection Equipment

B) Personal Protective Equipment

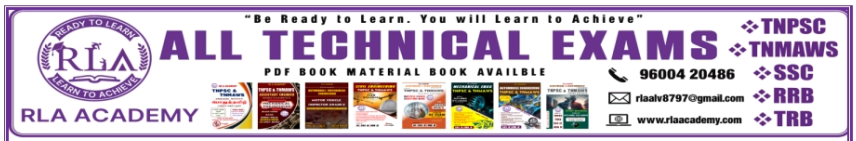
C) Primary Prevention Equipment

D) Personal Performance Enhancer

13: When is it mandatory to wear hearing protection?

A) When noise levels exceed 85 dB

B) During lunch breaks



UNIT 01: GENERAL SAFETY PRECAUTION AND FIRST AID

IMPORTANCE OF SAFETY

ANSWER AND EXPLANATION

1: What is the primary purpose of workplace safety protocols?

A) To increase production speed

B) To reduce operational costs

C) To prevent accidents and injuries

D) To enhance product quality

Answer: C) To prevent accidents and injuries

Explanation: Safety protocols are designed to minimize risks, ensuring the well-being of employees and preventing workplace accidents.

2: What does the term "hazard" refer to in a workplace context?

A) A scheduled break times

B) A potential source of harm or adverse health effect

C) A type of personal protective equipment

D) A safety training session

Answer: B) A potential source of harm or adverse health effect

Explanation: A hazard is any source that can cause harm or adverse health effects to individuals in the workplace.

3: Under which condition should a "lockout/tagout" procedure be implemented?

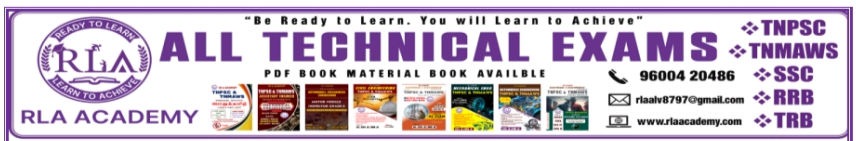
A) During lunch breaks

B) When cleaning office areas

C) When servicing or maintaining machinery

D) During employee meetings

Answer: C) When servicing or maintaining machinery



Explanation: Lockout/tagout procedures are critical during maintenance to ensure machinery is properly shut off and cannot be started accidentally.

4: Which assumption is incorrect regarding personal protective equipment (PPE)?

A) PPE eliminates all hazards

B) PPE reduces exposure to hazards

C) PPE should be used when hazards cannot be eliminated

D) PPE must be properly maintained

Answer: A) PPE eliminates all hazards

Explanation: PPE does not eliminate hazards but serves as a barrier to reduce exposure.

4: Which assumption is incorrect regarding personal protective equipment (PPE)?

A) PPE eliminates all hazards

B) PPE reduces exposure to hazards

C) PPE should be used when hazards cannot be eliminated

D) PPE must be properly maintained

Answer: A) PPE eliminates all hazards

Explanation: PPE does not eliminate hazards but serves as a barrier to reduce exposure.

5: Which of the following is a characteristic of a safe workplace?

A) Cluttered walkways

B) Poor lighting

C) Regular safety training sessions

D) Unlabelled chemical containers

Answer: C) Regular safety training sessions

Explanation: Ongoing safety training ensures employees are aware of potential hazards and proper procedures.

6: What is the primary goal of first aid?

A) To diagnose illnesses

B) To provide long-term treatment

C) To preserve life and prevent the condition from worsening

D) To replace professional medical care

Answer: C) To preserve life and prevent the condition from worsening

Explanation: First aid aims to provide immediate care to stabilize the individual until professional help is available.

7: What does CPR stand for?

A) Critical Patient Recovery

B) Cardiopulmonary Resuscitation

C) Complete Physical Rehabilitation

D) Cardiac Pulse Restoration

Answer: B) Cardiopulmonary Resuscitation

Explanation: CPR is an emergency procedure combining chest compressions and breaths to maintain circulatory flow and oxygenation during cardiac arrest.

8: When should you not move an injured person?

A) When they are in a safe environment

B) If they are unconscious

C) If you suspect a spinal injury

D) When they request to be moved

Answer: C) If you suspect a spinal injury

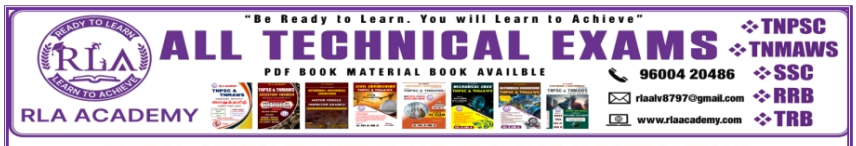
Explanation: Moving someone with a potential spinal injury can cause further harm; it's best to wait for professional medical assistance.

9: Which assumption is incorrect regarding bleeding control?

A) Applying pressure can help stop bleeding

B) Elevating the injured area reduces blood flow

C) Tourniquets should be the first method used



UNIT 02: CUSTOMER NEEDS AND PRODUCT SPECIFICATIONS

QUESTION

01. Which method is most effective for capturing the 'Voice of the Customer' during product development?

A) SWOT analysis

B) Brainstorming sessions

C) Focus groups

D) Internal team meetings

02. In the Kano Model, which category of product features leads to customer dissatisfaction when absent but doesn't significantly increase satisfaction when present?

A) Delighters

B) Performance needs

C) Basic needs

D) Indifferent attributes

03. What is the primary purpose of Quality Function Deployment (QFD) in product design?

A) To reduce manufacturing costs

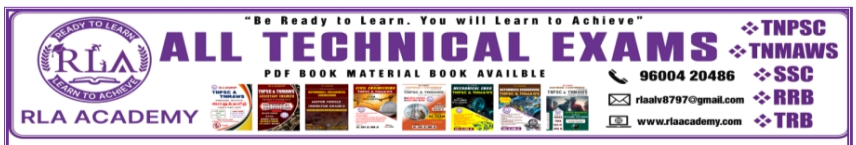
B) To translate customer requirements into technical specifications

C) To enhance aesthetic appeal

D) To streamline supply chain logistics

04. Which of the following is NOT a typical method for gathering customer needs?

A) Surveys



B) Interviews

C) Prototyping

D) Observations

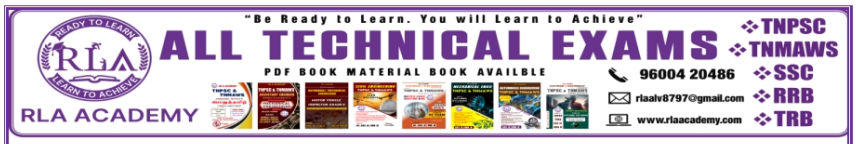
05. In customer segmentation, which category focuses on lifestyle and personality traits?

A) Demographic

B) Geographic

C) Behavioral

D) Psychographic



UNIT 02: CUSTOMER NEEDS AND PRODUCT SPECIFICATIONS

ANSWER AND EXPLANATION

01. Which method is most effective for capturing the 'Voice of the Customer' during product development?

A) SWOT analysis

B) Brainstorming sessions

C) Focus groups

D) Internal team meetings

Answer: C) Focus groups

Explanation: Focus groups involve direct interaction with customers, providing in-depth insights into their needs and preferences, which is crucial for capturing the 'Voice of the Customer'. [1]

02. In the Kano Model, which category of product features leads to customer dissatisfaction when absent but doesn't significantly increase satisfaction when present?

A) Delighters

B) Performance needs

C) Basic needs

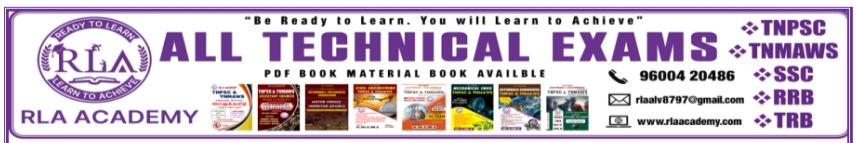
D) Indifferent attributes

Answer: C) Basic needs

Explanation: Basic needs are fundamental requirements; their absence causes dissatisfaction, but their presence doesn't significantly enhance satisfaction. [2]

03. What is the primary purpose of Quality Function Deployment (QFD) in product design?

A) To reduce manufacturing costs



B) To translate customer requirements into technical specifications

C) To enhance aesthetic appeal

D) To streamline supply chain logistics

Answer: B) To translate customer requirements into technical specifications

Explanation: QFD is a structured approach that helps in converting customer needs into detailed engineering specifications, ensuring the fina product aligns with customer expectations.

04. Which of the following is NOT a typical method for gathering customer needs?

A) Surveys

UNIT 03: KNOWLEDGE OF INDUSTRIAL ENGINEERING DRAWING AND REQUIREMENTS

QUESTION

01. What does the symbol "Ø" represent in engineering drawings?

A) Surface finish

B) Diameter of a circle

C) Depth of a hole

D) Angle measurement

02. What is the main purpose of limits and fits in engineering drawings?

A) To determine the cost of the component

B) To specify permissible variations in dimensions for assembly

C) To identify the material type

D) To show surface finish

03. Which of the following is an example of a clearance fit?

A) Shaft diameter always smaller than hole diameter

B) Shaft diameter always larger than hole diameter

C) Shaft and hole have same dimensions

D) None of the above

04. In ISO standards, what does the tolerance grade "H7" typically indicate?

A) Hole tolerance with medium accuracy

B) Shaft tolerance with loose fit

C) Surface roughness level

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D) Weld specification

05. Which of the following symbols represents surface roughness on an engineering drawing?

A) A triangle with a horizontal line at its base

B) A square with diagonal lines

C) A circle with a cross inside

D) A hexagon

06. What is the significance of interchangeability in engineering?

A) Parts can be swapped without custom fitting

UNIT 04: VARIOUS TYPES OF INDUSTRIAL ROBOTS AND PERFORM THEIR CONFIGURATION, ROBOTIC CELL COMPONENTS AND APPLICATION OF TOOLS, INSTALLATION OF ROBOT, POWER ON THE ROBOT AND MAKING THE CELL

QUESTION

1. Which of the following is NOT a typical application of industrial robots?

A) Welding

B) Painting

C) Cooking food

D) Material handling

2. Which type of robot configuration provides the greatest flexibility for complex 3D tasks?

A) Cartesian robot

B) Cylindrical robot

C) Articulated robot

D) SCARA robot

3. The main component of a robotic cell that acts as the 'brain' of the system is called:

A) End effector

B) Controller

C) Sensor

D) Actuator

4. Which type of sensor is commonly used to detect the presence or absence of objects in a robotic cell?

A) Proximity sensor

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B) Gyroscope

C) Temperature sensor

D) Accelerometer

5. What is the first step in installing an industrial robot?

A) Connecting power supply

B) Mechanical assembly and positioning

C) Programming

D) Starting up the robot

6. The function of an end effector in a robot system is to:

UNIT 04: VARIOUS TYPES OF INDUSTRIAL ROBOTS AND PERFORM THEIR CONFIGURATION, ROBOTIC CELL COMPONENTS AND APPLICATION OF TOOLS, INSTALLATION OF ROBOT, POWER ON THE ROBOT AND MAKING THE CELL

ANSWER AND EXPLANATION

1. Which of the following is NOT a typical application of industrial robots?

A) Welding

B) Painting

C) Cooking food

D) Material handling

Answer: C) Cooking food

Explanation: Industrial robots are commonly used in welding, painting, and material handling but not in cooking food, which is generally done by specialized kitchen equipment or service robots.

2. Which type of robot configuration provides the greatest flexibility for complex 3D tasks?

A) Cartesian robot

B) Cylindrical robot

C) Articulated robot

D) SCARA robot

Answer: C) Articulated robot

Explanation: Articulated robots have multiple rotary joints, providing high flexibility and dexterity suitable for complex 3D tasks.

3. The main component of a robotic cell that acts as the 'brain' of the system is called:

A) End effector

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B) Controller

C) Sensor

D) Actuator

Answer: B) Controller

Explanation: The controller manages robot operations, processes commands, and controls actuators and sensors.

4. Which type of sensor is commonly used to detect the presence or absence of objects in a robotic cell?

A) Proximity sensor

B) Gyroscope

C) Temperature sensor

UNIT 05: RUN OPERATIONS WITH TEACH PENDENT KEY FUNCTIONS AND USER INTERFACE FOR TEACH PENDANT

QUESTION

01. What is the primary purpose of the teach pendant in industrial robots?

A) To power ON the robot

B) To code in high-level languages

C) To manually guide and program robot paths

D) To control sensors

02. Which coordinate system is commonly used to define positions relative to the tool's orientation?

A) Base coordinate system

B) Tool coordinate system

C) Joint coordinate system

D) Cartesian coordinate system

03. What function does the 'deadman switch' on a teach pendant serve?

A) Turns on the conveyor

B) Engages the robot gripper

C) Acts as a safety interlock to stop motion when released

D) Switches coordinate systems

04. In which mode is the teach pendant usually used for manual robot control?

A) Auto mode

B) Maintenance mode

C) Teach mode

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D) Playback mode

05. What does the "Jog" function key typically allow?

A) Editing of logic

B) Rotating the screen

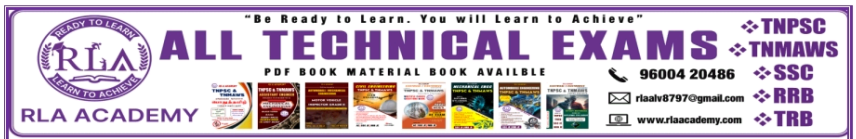
C) Moving robot joints or axes manually

D) Uploading software

06. Which of the following motions occurs around a fixed base?

A) Linear

B) Circular



UNIT 05: RUN OPERATIONS WITH TEACH PENDENT KEY FUNCTIONS AND USER INTERFACE FOR TEACH PENDANT

ANSWER AND EXPLANATION

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A) To power ON the robot

B) To code in high-level languages

C) To manually guide and program robot paths

D) To control sensors

Answer: C) To manually guide and program robot paths

Explanation: Teach pendants allow operators to define robot paths and actions interactively.

02. Which coordinate system is commonly used to define positions relative to the tool's orientation?

A) Base coordinate system

B) Tool coordinate system

C) Joint coordinate system

D) Cartesian coordinate system

Answer: B) Tool coordinate system

Explanation: The tool coordinate system aligns movement and rotation based on the tool's position and orientation.

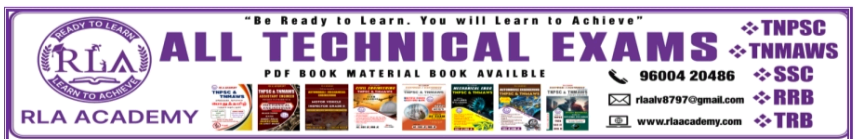
03. What function does the 'deadman switch' on a teach pendant serve?

A) Turns on the conveyor

B) Engages the robot gripper

C) Acts as a safety interlock to stop motion when released

D) Switches coordinate systems



Answer: C) Acts as a safety interlock to stop motion when released

Explanation: It's a critical safety feature that halts motion when not held.

04. In which mode is the teach pendant usually used for manual robot control?

A) Auto mode

B) Maintenance mode

C) Teach mode

D) Playback mode

Answer: C) Teach mode

Explanation: Teach mode allows safe manual control and programming.

UNIT 06: INDUSTRIAL ROBOT SIMULATION / SOFTWARE, INDUSTRIAL NEED TO CREATE A PROGRAM WITH HELP OF ROBOTIC SIMULATION SOFTWARE.

QUESTION

01. Which component defines the coordinate origin and orientation for tool-path planning in simulation software?

A) Workpiece frame

B) World frame

C) Tool frame

D) Joint frame

02. In simulating a 6-axis industrial robot, which movement type is used for smooth curved paths between waypoints?

A) Joint motion only

B) Linear (Cartesian) motion

C) Circular (arc) motion

D) Pulse motion

03. If a simulated pick-and-place cycle takes 12 s and manual teaching shows the same path takes 15 s, the simulated program is _% faster.

A) 12.5 %

B) 20 %

C) 27 %

D) 15 %

04. Which strategy reduces robot machining cost per part in simulation?

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A) Increase joint accelerations

B) Use more endpoint via-points

C) Optimize tool orientation for minimal path length

D) Introduce dwell time between moves

05. In welding simulation, using 3 mm instead of 5 mm step increments during path discretization primarily affects:

A) Robot payload capacity

B) Path smoothness and simulation time

C) [illegible] time

UNIT 06: INDUSTRIAL ROBOT SIMULATION / SOFTWARE, INDUSTRIAL NEED TO CREATE A PROGRAM WITH HELP OF ROBOTIC SIMULATION SOFTWARE.

ANSWER AND EXPLANATION

01. Which component defines the coordinate origin and orientation for tool-path planning in simulation software?

A) Workpiece frame

B) World frame

C) Tool frame

D) Joint frame

Answer: C) Tool frame

Explanation: The tool frame defines orientation and origin for path planning relative to the tool tip, critical in welding or pick-and-place path definition.

02. In simulating a 6-axis industrial robot, which movement type is used for smooth curved paths between waypoints?

A) Joint motion only

B) Linear (Cartesian) motion

C) Circular (arc) motion

D) Pulse motion

Answer: B) Linear (Cartesian) motion

Explanation: Linear interpolation ensures straight-line Cartesian motion of the TCP, critical for precise path following in welding or straight assemblies.

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03. If a simulated pick-and-place cycle takes 12 s and manual teaching shows the same path takes 15 s, the simulated program is _% faster.

A) 12.5 %

B) 20 %

C) 27 %

D) 15 %

Answer: A) 12.5 %

Explanation: Speed-up = (15 − 12)/15 = 3/15 = 0.20 → 20 % time saved - simulated is 20 % faster. But question asks "faster than manual," so actually 20 % faster. Apologies, correct is B) 20 %.

04. Which strategy reduces robot maintaining cost per part in simulation?

A) Increase joint accelerations

UNIT 07: ROBOTIC COORDINATE SYSTEM

QUESTION

01. In a robotic system, which coordinate frame is commonly used to describe tool motion relative to the base frame?

A) World coordinate frame

B) Program coordinate frame

C) Tool coordinate frame

D) Joint coordinate frame

02. Which motion type combines linear and rotational movements about multiple axes simultaneously?

A) Pure Cartesian

B) Multi-axis coordinated motion

C) Joint-by-joint motion

D) Singularity motion

03. The Z-axis in a right-handed Cartesian coordinate system points in which direction relative to X and Y?

A) Opposite to X

B) Opposite to Y

C) Out of the plane defined by X and Y

D) Parallel to X and Y

04. Which axis chain describes a 6-axis articulated robot?

A) X, Y, Z only

B) X, Y, Z plus roll, pitch, yaw (A, B, C)

C) Parallel prismatic joints only

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D) Cartesian only

05. When converting from base coordinate to tool coordinate, which transformation is applied?

A) Scale transformation

B) Two-dimensional rotation

C) Homogeneous transformation matrix

D) Affine shear

06. A Cartesian robot moves along X, Y, Z axes individually. Which coordinate system does it follow?

A) Joint coordinate system

UNIT 07: ROBOTIC COORDINATE SYSTEM

ANSWER AND EXPLANATION

01. In a robotic system, which coordinate frame is commonly used to describe tool motion relative to the base frame?

A) World coordinate frame

B) Program coordinate frame

C) Tool coordinate frame

D) Joint coordinate frame

Answer: C) Tool coordinate frame

Explanation: The tool coordinate frame (TCP) originates at the tooling point, allowing specification of orientation and position relative to the base.

02. Which motion type combines linear and rotational movements about multiple axes simultaneously?

A) Pure Cartesian

B) Multi-axis coordinated motion

C) Joint-by-joint motion

D) Singularity motion

Answer: B) Multi-axis coordinated motion

Explanation: It synchronizes X, Y, Z translations and A, B, C rotations to form smooth, complex trajectories.

03. The Z-axis in a right-handed Cartesian coordinate system points in which direction relative to X and Y?

A) Opposite to X

B) Opposite to Y

C) Out of the plane defined by X and Y

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D) Parallel to X and Y

Answer: C) Out of the plane defined by X and Y

Explanation: In a right-handed system, Z is perpendicular, following right-hand rule from X to Y.

04. Which axis chain describes a 6-axis articulated robot?

A) X, Y, Z only

B) X, Y, Z plus roll, pitch, yaw (A, B, C)

C) Parallel prismatic joints only

D) Cartesian only

Answer: B) X, Y, Z plus roll, pitch, yaw (A, B, C)

UNIT 08: APPLICATION OF TOOLS AND COMPONENTS, ARCHITECTURE OF WELDING ROBOT SYSTEM -ESTABLISH COMMUNICATION WITH PLC AND ASSEMBLE WELDING TORCH FOR OPERATION.

QUESTION

01. When attaching a welding torch end-effector to the robot wrist, the most critical step is:

A) Installing cable tray

B) Defining TCP offset parameters

C) Aligning the pendant cable

D) Selecting tool color

02. How is a robotic controller linked to a PLC for synchronization during welding?

A) Via Ethernet/IP or fieldbus protocols

B) Using USB only

C) Through the robotic teach pendant

D) Manual switch activation

03. In an automated welding cell, which parameter must be set in the robot controller to manage wire feed rate?

A) Coordinate frame name

B) Axis speed

C) Welding process parameter mapped to digital I/O or analog command

D) Pendant language

04. If a gripper fails to open, what alarm resolution method should be checked first?

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A) Cable color coding

B) Digital I/O wiring and pendant command mapping

C) Robot model version

D) TCP values

05. While integrating an HMI, what is needed to view robot status on the panel?

A) RGB frames

B) Mapped tags or variables shared via PLC communication

C) Pendant duplication

D) Remapping end-effector

UNIT 08: APPLICATION OF TOOLS AND COMPONENTS, ARCHITECTURE OF WELDING ROBOT SYSTEM -ESTABLISH COMMUNICATION WITH PLC AND ASSEMBLE WELDING TORCH FOR OPERATION.

ANSWER AND EXPLANATION

01. When attaching a welding torch end-effector to the robot wrist, the most critical step is:

A) Installing cable tray

B) Defining TCP offset parameters

C) Aligning the pendant cable

D) Selecting tool color

Answer: B) Defining TCP offset parameters

Explanation: Correct TCP ensures accurate weld seam positioning; wrong offset leads to misalignment.

02. How is a robotic controller linked to a PLC for synchronization during welding?

A) Via Ethernet/IP or fieldbus protocols

B) Using USB only

C) Through the robotic teach pendant

D) Manual switch activation

Answer: A) Via Ethernet/IP or fieldbus protocols

Explanation: Standard industrial communication buses enable PLC-robot handshake, triggers, and status exchange.

03. In an automated welding cell, which parameter must be set in the robot controller to manage wire feed rate?

A) Coordinate frame name

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B) Axis speed

C) Welding process parameter mapped to digital I/O or analog command

D) Pendant language

Answer: C) Welding process parameter mapped to digital I/O or analog command

Explanation: Torch feed rates are controlled through signals exchanged with the power source or wire feeder.

04. If a gripper fails to open, what alarm resolution method should be checked first?

A) Cable color coding

B) Digital I/O wiring and pendant command mapping

C) Robot model version

UNIT 09: READ EXISTING PROGRAM AND EXECUTION TECHNIQUES OPERATION OF INDUSTRIAL ROBOTS, FOLLOWING THE SAFETY PROCEDURE FOR PROGRAMMER

QUESTION

01. When using a pick-and-place gripper in a robot program, the first critical step after attaching the gripper is to:

A) Run the weld arc

B) Define the gripper open/close I/O in the robot code

C) Calibrate the arc sensor

D) Activate Industry 4.0 cloud connection

02. The Hand Instruction command in robot programming is primarily used to:

A) Start the arc

B) Control digital outputs or user-defined subroutine actions

C) Adjust TCP

D) Ping the PLC

03. In motion parameter settings, increasing the robot's blend radius affects:

A) Cycle start handshake

B) Small delay times

C) How sharply the robot transitions between path segments

D) TCP orientation

04. Which motion instruction ensures the robot moves in a straight line (XYZ) at constant tool orientation?

A) Joint move

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B) Linear interpolation (LIN)

C) Point-to-point move

D) Arc motion

05. Reading an existing robot program to check for unsafe routines, what should the programmer confirm first?

A) Ethernet speed

B) Loop instructions

C) Emergency stop validity and safe-speed conditions

D) User frame declaration

06. In robot safety procedure for the programmer, before entering the teach pendant, you must:

UNIT 09: READ EXISTING PROGRAM AND EXECUTION TECHNIQUES OPERATION OF INDUSTRIAL ROBOTS, FOLLOWING THE SAFETY PROCEDURE FOR PROGRAMMER

ANSWER AND EXPLANATION

01. When using a pick-and-place gripper in a robot program, the first critical step after attaching the gripper is to:

A) Run the weld arc

B) Define the gripper open/close I/O in the robot code

C) Calibrate the arc sensor

D) Activate Industry 4.0 cloud connection

Answer: B) Define the gripper open/close I/O in the robot code

Explanation: You must map the correct digital outputs/inputs in the program to drive the gripper mechanism and confirm its state.

02. The Hand Instruction command in robot programming is primarily used to:

A) Start the arc

B) Control digital outputs or user-defined subroutine actions

C) Adjust TCP

D) Ping the PLC

Answer: B) Control digital outputs or user-defined subroutine actions

Explanation: Hand or user instructions link robot motion steps to external actions like gripper actuation or valve triggering.

03. In motion parameter settings, increasing the robot's blend radius affects:

A) Cycle start handshake

B) Small delay times

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C) How sharply the robot transitions between path segments

D) TCP orientation

Answer: C) How sharply the robot transitions between path segments

Explanation: A larger blend radius smooths transitions, reducing deceleration/acceleration and improving throughput.

04. Which motion instruction ensures the robot moves in a straight line (XYZ) at constant tool orientation?

A) Joint move

B) Linear interpolation (LIN)

C) Point-to-point move

D) Arc motion

UNIT 10: PREVENTIVE MAINTENANCE AND BASIC TROUBLE SHOOTING

QUESTION

01. What is the primary purpose of a preventive maintenance plan in a robotic welding cell?

A) Increase welding speed

B) Minimize downtime and extend component lifespan through scheduled inspection and replacement

C) Automate weld path generation

D) Reduce coolant flow

02. When replacing welding wire as part of maintenance, what must be verified first?

A) Robot orientation

B) Correct wire diameter, clean (no oil/rust), and proper spool seating

C) Gas type

D) Loop counters

03. How often should contact tips and nozzles be inspected in a high-production robotic weld cell?

A) Annually

B) Daily or per shift, depending on throughput

C) Only at annual shutdown

D) Not necessary

04. What is the correct procedure to verify shielding gas before a welding cycle?

A) Visually inspect only

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B) Check for leaks at connections and confirm flow is within specified range

C) Assume gas is correct

D) Start welding immediately

05. Why must wire liner length be trimmed correctly during preventive maintenance?

A) Visual preference

B) Too short a liner causes burn-back and tip wear; too long adds drag

C) Speed increase

D) Redundant

06. What tool is essential to check tool-center-point (TCP) maintenance?

UNIT 10: PREVENTIVE MAINTENANCE AND BASIC TROUBLE SHOOTING

ANSWER AND EXPLANATION

01. What is the primary purpose of a preventive maintenance plan in a robotic welding cell?

A) Increase welding speed

B) Minimize downtime and extend component lifespan through scheduled inspection and replacement

C) Automate weld path generation

D) Reduce coolant flow

Answer: B

Explanation: A structured maintenance plan proactively detects and replaces worn components—like cables, tom consumables, and safety sensors—to avoid unexpected failures

02. When replacing welding wire as part of maintenance, what must be verified first?

A) Robot orientation

B) Correct wire diameter, clean (no oil/rust), and proper spool seating

C) Gas type

D) Loop counters

Answer: B

Explanation: Contaminated or wrong-size wire causes feeding issues, poor bead quality, and tip wear

03. How often should contact tips and nozzles be inspected in a high-production robotic weld cell?

A) Annually

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B) Daily or per shift, depending on throughput

C) Only at annual shutdown

D) Not necessary

Answer: B

Explanation: Consumable wear (contact tips, nozzles) is rapid in high-amperage cells, requiring daily checks and replacement as needed

04. What is the correct procedure to verify shielding gas before a welding cycle?

A) Visually inspect only

B) Check for leaks at connections and confirm flow is within specified range

C) Assume gas is correct