NTA Robotics Safety and Systems Review (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

Table of Contents

Copyright 1
Table of Contents 2
Introduction 3
How to Use This Guide 4
Questions 5
Answers 9
Explanations 11
Next Steps 17

Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- **Practice answering questions under realistic conditions,**
- **Improve accuracy and speed,**
- **Review explanations to strengthen weak areas, and**
- **Approach the exam with greater confidence.**

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. **What are the three core steps of hazard identification and risk assessment in robotics safety according to ISO 12100?**
   - A. Hazard identification, risk estimation (severity and probability), and risk reduction (selecting protective measures and validating residual risk).
   - B. Hazard elimination, risk transfer, and incident investigation.
   - C. Safety planning, performance testing, and documentation.
   - D. Safety review, hazard logging, and employee training.

2. **The space in which the robot performs its function after restrictions are implemented is called what?**
   - A. Restricted Space
   - B. Maximum Space
   - C. Safe Space
   - D. Operating Space

3. **Which device is used to cycle power to the FANUC controller?**
   - A. Keyboard
   - B. iPendant
   - C. Monitor
   - D. Mouse

4. **The work envelope is defined as the maximum reach of the robot.**
   - A. The rear clearance area around the robot
   - B. The minimum safe distance to obstacle
   - C. The total operating time of the robot
   - D. The maximum reach of the robot

5. **All robot systems are the same; therefore safety systems can be universal from one robot system to the next.**
   - A. True
   - B. False
   - C. Not always
   - D. Sometimes

6. **Why is clearance and access control essential in robotic work cells?**
   - **A. Prevents unauthorized entry into hazard zones and ensures only trained personnel can interact with the system.**
   - **B. Allows anyone to access the machine for convenience.**
   - **C. Removes all safety interlocks to speed up maintenance.**
   - **D. Is only necessary during initial installation.**

7. **Which practice is most essential when testing a program for the first time?**
   - **A. Make sure all personnel are outside the work envelope before running**
   - **B. Use low motion speed, to single step the program through at least one cycle**
   - **C. Calibrate all frames used in the program**
   - **D. Calibrate all tools used in the program**

8. **Which statement best describes functional safety in robotics?**
   - **A. It is solely about preventing hardware failures**
   - **B. It concerns the robot's aesthetics**
   - **C. It focuses on the behavior of electrical/electronic/programmable systems to ensure safety-related functions perform correctly**
   - **D. It relates only to initial robot commissioning**

9. **The FANUC Software, working with the robot and controller, allows you to display and monitor process information.**
   - **A. True**
   - **B. False**
   - **C. Not at all**
   - **D. Only in offline mode**

10. Which of the following is NOT a characteristic of an effective emergency stop device?

A. Easily accessible

B. Fail-safe

C. Self-latching

D. Hidden behind panels and rarely used

Answers

1. A
2. D
3. B
4. D
5. B
6. A
7. A
8. D
9. A
10. D

Explanations

1. **What are the three core steps of hazard identification and risk assessment in robotics safety according to ISO 12100?**

   A. **Hazard identification, risk estimation (severity and probability), and risk reduction (selecting protective measures and validating residual risk).**

   B. **Hazard elimination, risk transfer, and incident investigation.**

   C. **Safety planning, performance testing, and documentation.**

   D. **Safety review, hazard logging, and employee training.**

In robotics safety, ISO 12100 treats hazard identification and risk assessment as a three-step process: identify hazards; estimate risk by considering how severe the harm could be and how likely exposure is; and reduce risk by selecting protective measures and validating the residual risk. Hazard identification is a systematic sweep across the robot's life cycle and use scenarios to surface potential harms, such as mechanical pinch points, electrical faults, software errors, or unsafe human-robot interactions. Risk estimation combines the potential severity with the probability or exposure frequency to judge how risky each hazard is and which ones to prioritize. Risk reduction then puts controls in place—engineering safeguards, safe operating procedures, training, and other protective measures—and verifies that the remaining risk is acceptable, often using the ALARP principle, rechecking as the design or use changes. The other options describe activities not aligned with this three-step structure or omit hazard identification and risk estimation, focusing instead on planning, testing, documentation, or training rather than the risk assessment sequence ISO 12100 specifies.

2. **The space in which the robot performs its function after restrictions are implemented is called what?**

   A. **Restricted Space**

   B. **Maximum Space**

   C. **Safe Space**

   D. **Operating Space**

Defining the area where the robot can operate after safety restrictions are put in place creates the operating space. This envelope reflects the robot's reach and allowed motion under safeguards like guards and interlocks, ensuring we can predict the robot's actions and maintain safe clearances around people and equipment. Operating within this space minimizes risk by keeping movement, speed, and paths within defined, safe boundaries. If a task would require going outside this space, the safeguards or the task setup would need to be reconsidered. That's why the term operating space is the most accurate label for the region where safe, functional robot operation is guaranteed. Other terms don't convey this precise, safety-focused boundary.

3. Which device is used to cycle power to the FANUC controller?

A. Keyboard

B. iPendant

C. Monitor

D. Mouse

Power cycling the FANUC controller is done from the control interface rather than from ordinary peripherals. The iPendant is the handheld control unit that connects to the controller and provides the official power-cycle capability, allowing you to shut down and restart the controller in a controlled, documented way from a safe location. Peripherals like a keyboard, monitor, or mouse are just input/output devices and do not offer a built-in method to cycle the controller's power. Using the iPendant for the power cycle aligns with how the system is designed to be operated and reset, ensuring the proper boot sequence and safety checks are followed.

4. The work envelope is defined as the maximum reach of the robot.

A. The rear clearance area around the robot

B. The minimum safe distance to obstacle

C. The total operating time of the robot

D. The maximum reach of the robot

A robot's work envelope is the space the robot can reach with its end effector, determined by the lengths of its links and the limits of its joints. The defining feature of that envelope is the maximum reach—the farthest distance the arm can extend from the base. This maximum reach sets the bounds of where tasks can be performed, which is why it best describes the work envelope in safety and systems contexts. The rear clearance area is about space behind the robot and avoiding collisions in that direction, not the overall reachable space. The minimum safe distance to an obstacle is a safety margin, not the extent of reach. The total operating time concerns how long the robot can run, not where it can reach. So the work envelope aligns with the maximum reach.

5. All robot systems are the same; therefore safety systems can be universal from one robot system to the next.

A. True

B. False

C. Not always

D. Sometimes

Safety systems must be designed around the specific hazards and risk profile of a given robot system. Robots differ in type, reach, speed, payload, work environment, control architecture, and how they interact with people and other equipment. These differences create unique hazards and necessitate different protective measures and safety controls, such as appropriate stopping methods, interlocks, safeguarding, and safe control modes. Standards and risk assessments guide what needs to be in place for each installation, so a one-size-fits-all safety solution won't reliably address the specific risks of every system. Some components can be reused if they meet the required safety performance for that particular setup, but each system must be evaluated and validated individually.

6. Why is clearance and access control essential in robotic work cells?

A. Prevents unauthorized entry into hazard zones and ensures only trained personnel can interact with the system.

B. Allows anyone to access the machine for convenience.

C. Removes all safety interlocks to speed up maintenance.

D. Is only necessary during initial installation.

Clearance and access control protect people by keeping them out of the robot's hazardous working areas and by ensuring only trained personnel interact with the system. In a robotic work cell, the robot can move with little warning and reach into zones where a person could be struck, crushed, or pinned. By restricting entry to those who understand the risks and follow proper procedures, you greatly reduce the chance of accidental contact and ensure that safety features—guards, interlocks, and controlled start-up/shutdown sequences—are properly used. This approach also supports safe maintenance, where power can be isolated and tasks performed under approved conditions. Unrestricted access, removal of safety interlocks, or restricting access only to initial installation would defeat these protections and increase the risk of harm.

7. Which practice is most essential when testing a program for the first time?

A. Make sure all personnel are outside the work envelope before running

B. Use low motion speed, to single step the program through at least one cycle

C. Calibrate all frames used in the program

D. Calibrate all tools used in the program

Testing a program for the first time carries the highest risk of unexpected robot motion due to programming mistakes or misconfigurations. The most essential safety step is making sure all personnel are outside the robot's work envelope—the space the robot can reach during its movements. If someone is within that area, even a brief, unanticipated move can cause injury. Keeping people clear removes the immediate hazard and protects anyone who might be nearby during the initial, unverified run. Other practices help with safety and debugging, but they don't address the core risk as directly. Running at a slow speed or stepping through a cycle can reduce exposure, yet a fault could still cause sudden movement toward someone in range. Calibrating frames or tools improves accuracy, but it doesn't mitigate the danger posed by an unforeseen robot motion during the first test.

8. Which statement best describes functional safety in robotics?

A. It is solely about preventing hardware failures

B. It concerns the robot's aesthetics

C. It focuses on the behavior of electrical/electronic/programmable systems to ensure safety-related functions perform correctly

D. It relates only to initial robot commissioning

Functional safety in robotics is about ensuring that the safety-related functions implemented in electrical, electronic, and programmable systems behave correctly, especially under fault conditions. It emphasizes how the robot's safety-critical software and hardware work together to detect faults, transition to a safe state, and keep people protected, rather than just preventing hardware failures or looking good aesthetically. This includes safety actions like emergency stops, safe-speed limits, power isolation, and interlocks, all backed by diagnostics and verification to maintain reliable performance throughout the robot's life cycle. The other statements miss important parts of the picture: safety isn't only about hardware reliability, it isn't about aesthetics, and it isn't limited to the initial commissioning. Functional safety covers the ongoing behavior of safety-related functions, their monitoring, and their verification across operation and maintenance.

9. The FANUC Software, working with the robot and controller, allows you to display and monitor process information.

A. True

B. False

C. Not at all

D. Only in offline mode

Real-time visibility of what the robot is doing is a fundamental capability when FANUC software runs with the robot and its controller. The software interfaces with the controller to pull live data from the robot and the process—things like current position, joint angles, speeds, tool data, I/O status, alarms, and cycle times—and present it in dashboards, on the teach pendant, or in external HMIs. This allows operators to display and continuously monitor the process as it runs, spot issues, and make adjustments as needed. The idea that this only works offline isn't correct, since online monitoring is standard practice. Therefore, the statement is true.

10. Which of the following is NOT a characteristic of an effective emergency stop device?

A. Easily accessible

B. Fail-safe

C. Self-latching

D. Hidden behind panels and rarely used

An effective emergency stop is designed for rapid, reliable action in a crisis. It should be easily accessible so anyone can reach it without scrambling or searching. It must be fail-safe, meaning that a fault in the system tends to drive the device to stop rather than allow continued hazardous motion. It should be self-latching, so once pressed it maintains the stop condition until a deliberate reset is performed, preventing an accidental re-start. Hiding the device behind panels and making it rarely used defeats all of these safety goals by delaying or preventing immediate stopping when it's needed most. That's why the option describing a hidden, rarely used stop is not a characteristic of an effective emergency stop device.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://ntaroboticssafetysys.examzify.com

We wish you the very best on your exam journey. You've got this!