National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) Industrial and Systems Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Table of Contents

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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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 must a professional engineer consider before accepting a project on modern control systems?

A. Their professional license history

B. Their expertise in modern control systems

C. Their previous specialization in transportation systems

D. Attendance at engineering society meetings

2. Which cost reduction is expected with the use of pallets in operations?

A. 10% reduction in material costs

B. 15% reduction in breakage

C. 20% reduction in labor costs

D. 5% increase in efficiency

3. What is the mean rate of customer arrivals in a store?

A. 1/min

B. 2/min

C. 3/min

D. 4/min

4. What does 'just-in-time' (JIT) production emphasize?

A. Bulk production to reduce costs

B. Manufacturing products only as needed to minimize inventory

C. strategic outsourcing of production processes

D. Long-term storage of raw materials

5. Which of the following best describes inventory management?

A. The process of acquiring new machines

B. The administration of ordering, storing, and using a company's inventory

C. The tracking of employee performance metrics

D. The assessment of customer sales trends

6. Which function does the House of Quality serve in quality management?

- **A. A) Measures process stability**
- **B. B) Compares customer requirements to design specifications**
- **C. C) Identifies root causes of problems**
- **D. D) Graphically illustrates the risk of failure**

7. What is the main focus of 'quality assurance' in manufacturing?

- **A. To increase production rates**
- **B. To ensure that processes are followed correctly to meet quality standards**
- **C. To train employees on new machinery**
- **D. To cut costs associated with production**

8. What is the difference between primary and secondary data in industrial systems?

- **A. Primary data is collected firsthand for a specific purpose**
- **B. Secondary data is collected firsthand for a specific purpose**
- **C. Primary data is typically easier to analyze than secondary data**
- **D. Secondary data is more accurate than primary data**

9. Which of the following is not included in the three P's of requirements analysis?

- **A. A) Product**
- **B. B) Performance**
- **C. C) People**
- **D. D) Process**

10. What is the production rate of Process A?

- **A. 1400 units/hr**
- **B. 800 units/hr**
- **C. 100 units/hr**
- **D. 600 units/hr**

Answers

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

Explanations

1. What must a professional engineer consider before accepting a project on modern control systems?

A. Their professional license history

B. Their expertise in modern control systems

C. Their previous specialization in transportation systems

D. Attendance at engineering society meetings

Before accepting a project on modern control systems, a professional engineer must consider their expertise in modern control systems. This is crucial because effective engagement in a project requires a solid understanding of the relevant concepts, principles, and techniques associated with modern control systems. Proficiency in this area ensures that the engineer can competently design, analyze, or modify systems to meet project specifications and safety standards, thereby maintaining professional integrity and mitigating risks associated with inadequate knowledge. While other factors might be relevant to a professional's overall qualifications, such as licensing history, previous specializations, or participation in engineering societies, none directly pertain to the essential technical knowledge required for modern control systems. An engineer must be equipped with the necessary skills and understanding specific to the project at hand in order to guarantee quality outcomes and adhere to industry regulations.

2. Which cost reduction is expected with the use of pallets in operations?

A. 10% reduction in material costs

B. 15% reduction in breakage

C. 20% reduction in labor costs

D. 5% increase in efficiency

Using pallets in operations can lead to a significant reduction in breakage during the handling and transportation of goods. When products are stored or moved without proper support, the risk of damage increases due to impacts, shifting, and other handling stresses. Pallets provide a flat and stable platform that minimizes the movement of goods, thereby protecting items from falling or being damaged in transit. This stabilization directly correlates with a reduction in breakage, as the consistent and secure positioning helps absorb shocks and decreases the likelihood of accidents. Consequently, opting for pallets as part of the logistics and supply chain management can enhance the safety of materials while also contributing to overall cost savings associated with loss from damaged goods.

3. What is the mean rate of customer arrivals in a store?

A. 1/min

B. 2/min

C. 3/min

D. 4/min

The mean rate of customer arrivals in a store, typically denoted as λ (lambda), refers to the average number of customers that enter the store per unit of time, which is often expressed in terms like customers per minute. In this scenario, the mean rate provided as the correct answer indicates that, on average, two customers enter the store every minute. This number can be utilized in various operations management contexts, such as calculating service capacity, understanding customer flow, and managing inventory levels. In practical terms, understanding the mean arrival rate is crucial for store managers to ensure that staffing levels are adequate to provide efficient service, to avoid long wait times, and to optimize the shopping experience. The other options reflect different average rates of arrival that do not match the established mean of two customers per minute, making them less relevant to this specific question.

4. What does 'just-in-time' (JIT) production emphasize?

A. Bulk production to reduce costs

B. Manufacturing products only as needed to minimize inventory

C. strategic outsourcing of production processes

D. Long-term storage of raw materials

Just-in-time (JIT) production is a strategy that focuses on manufacturing products only as they are needed in the production process. This approach minimizes excess inventory by aligning production schedules closely with customer demand. By implementing JIT, companies can significantly reduce the costs associated with holding large quantities of inventory, such as storage fees, spoilage, and the financial burden of tied-up resources. JIT aims to enhance efficiency and improve the manufacturing process by ensuring that materials and products are produced and delivered right when they are required, eliminating waste from overproduction. It encourages a responsive and flexible manufacturing environment where adjustments can quickly be made to changes in demand or process variations, further optimizing production flow and reducing lead times.

5. Which of the following best describes inventory management?

A. The process of acquiring new machines

B. The administration of ordering, storing, and using a company's inventory

C. The tracking of employee performance metrics

D. The assessment of customer sales trends

Inventory management is fundamentally centered around the administration of ordering, storing, and utilizing a company's inventory. This involves a variety of activities aimed at ensuring that the right amount of inventory is maintained to meet customer demand while minimizing costs associated with holding excess inventory. Effective inventory management includes tracking stock levels, setting reorder points, and forecasting future inventory requirements based on sales trends and usage patterns. The role of inventory management is crucial because it directly impacts a company's efficiency, profitability, and ability to meet customer needs. Accurate inventory management can lead to improved cash flow, as it helps to prevent overstocking or stockouts that can disrupt operations or sales. In contrast, the other options refer to different aspects of business operations. Acquiring new machines relates to capital asset management, tracking employee performance metrics deals with human resource management, and assessing customer sales trends is part of marketing and sales strategy. While all these functions are essential to running a business, they do not encompass the comprehensive scope of inventory management like option B does.

6. Which function does the House of Quality serve in quality management?

A. A) Measures process stability

B. B) Compares customer requirements to design specifications

C. C) Identifies root causes of problems

D. D) Graphically illustrates the risk of failure

The House of Quality is a key component of the Quality Function Deployment (QFD) process, which is used to ensure that the needs and wants of customers are translated effectively into technical requirements for product development. The primary function of the House of Quality is to compare customer requirements with design specifications. This method allows teams to identify how well the current design meets customer expectations and where improvements can be made. By visually mapping the relationship between customer desires (what customers want) and technical requirements (how those desires can be achieved), stakeholders can prioritize features, functions, or performance criteria based on customer input. This alignment helps to ensure that the final product not only satisfies customer needs but also maintains a competitive edge in the market. Through this comprehensive analysis, teams can address potential gaps in design and functionality before the product goes into production, leading to higher quality outcomes and enhanced customer satisfaction.

7. What is the main focus of 'quality assurance' in manufacturing?

A. To increase production rates

B. To ensure that processes are followed correctly to meet quality standards

C. To train employees on new machinery

D. To cut costs associated with production

Quality assurance in manufacturing primarily focuses on ensuring that processes are followed correctly to meet established quality standards. This involves establishing systematic procedures that aim to prevent defects and ensure that the product being manufactured consistently meets the specified requirements and standards. By implementing quality assurance practices, a manufacturing operation can enhance customer satisfaction, reduce waste, and improve overall efficiency. The emphasis here is on the process rather than the end results, which means that quality assurance seeks to embed quality checks and balances at every stage of the production. This proactive approach prevents issues before they arise rather than merely addressing them after they occur. In contrast, the other options emphasize different aspects of the manufacturing process that, while important, do not encapsulate the primary aim of quality assurance. For example, increasing production rates or cutting costs might lead to compromised quality if not managed properly. Training employees on new machinery is vital but is more about operational training than safeguarding the quality of outputs through process adherence. Therefore, the focus of quality assurance is distinctly on the systematic approach to maintaining and improving product quality throughout production processes.

8. What is the difference between primary and secondary data in industrial systems?

A. Primary data is collected firsthand for a specific purpose

B. Secondary data is collected firsthand for a specific purpose

C. Primary data is typically easier to analyze than secondary data

D. Secondary data is more accurate than primary data

Primary data is defined as information that is collected directly from original sources specifically for the purpose of the study or analysis being conducted. This can include surveys, interviews, observations, and experiments where the data has not been previously gathered or published. The strength of primary data lies in its specificity and relevance to the research question at hand, as it is tailored to address the specific objectives of the study. In contrast, secondary data involves the use of information that has already been collected and published by others. This can include reports, articles, or datasets that were gathered for different purposes. While secondary data can provide valuable insights and save time and resources in research, it may not be as directly applicable to a specific study because it may not align perfectly with the researcher's objectives. The other options do not accurately reflect the definitions or characteristics of primary and secondary data. An example of these incorrect options would be the mischaracterization of secondary data as being collected firsthand. Additionally, primary data is often more challenging to analyze due to its specific nature and the need for careful design in data collection methods, while secondary data can sometimes be easier to analyze due to existing frameworks or established methodologies. Hence, the distinction is clear: primary data is uniquely gathered for a particular study, making

9. Which of the following is not included in the three P's of requirements analysis?

A. A) Product

B. B) Performance

C. C) People

D. D) Process

The three P's of requirements analysis consist of Product, Performance, and Process. These elements help in understanding the fundamental aspects needed for effective system or project development. The Product refers to the outcome or deliverable that is expected to satisfy user needs and requirements. Performance describes the criteria for how well the product should function, often covering aspects like speed, efficiency, and accuracy. The Process encompasses the methodologies and approaches used during development and implementation, guiding how work gets done. In contrast, the term related to People is not part of the three P's framework, even though stakeholder perspectives are crucial for requirements analysis. However, "People" as a standalone category does not align with the defined three P's, thus making it the element that is not included in this specific requirements analysis framework. Understanding these distinctions is important for effective project management and systems engineering.

10. What is the production rate of Process A?

A. 1400 units/hr

B. 800 units/hr

C. 100 units/hr

D. 600 units/hr

To determine the production rate of Process A, it's essential to consider how the production rate is calculated based on various parameters such as time, efficiency, machine capability, and any constraints that might affect production. The correct answer of 1400 units per hour indicates that the process is capable of producing a large quantity of units efficiently in a given timeframe, likely reflecting optimal operational settings, maximized resource utilization, and effective workflow management. This figure might suggest that Process A has superior technological capabilities or optimal scheduling practices that allow it to operate at a higher output. It could also mean that the process has minimal downtime, which is vital in achieving such a high rate of production. Factors like equipment reliability, staffing, and the layout of the production system would also influence this impressive output. Understanding the dynamics of process efficiency can aid in improving overall productivity, as well as in making informed decisions when designing systems for manufacturing or service delivery. It’s crucial to evaluate production rates against demand to maintain balance in operations.

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://ncees-fe-industrialandsystems.examzify.com

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