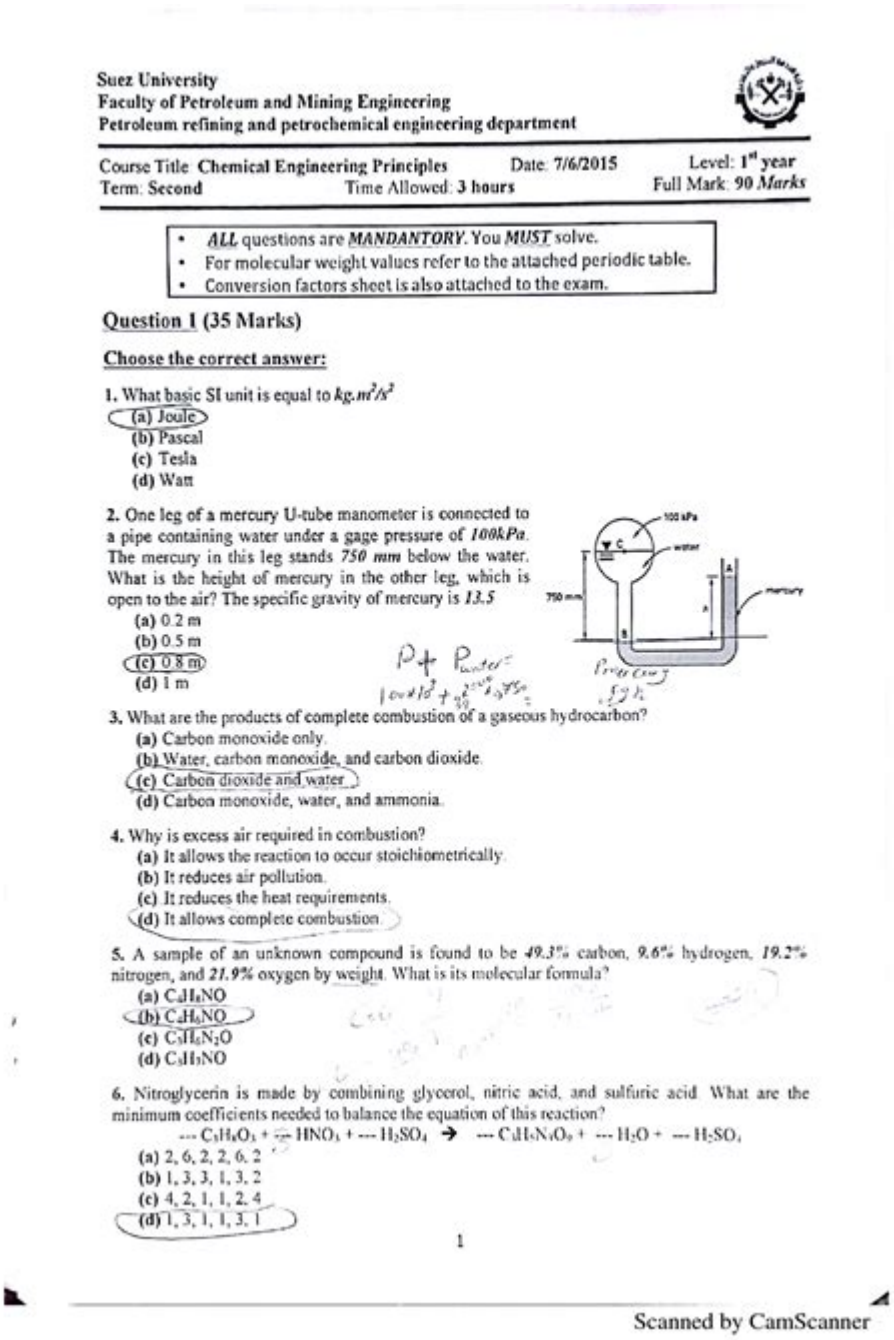
Chemical Engineering Fe Exam



Suez University
Faculty of Petroleum and Mining Engineering
Petroleum refining and petrochemical engineering department

Course Title: Chemical Engineering Principles — Date: 7/6/2015 — Level: 1st year
Term: Second — Time Allowed: 3 hours — Full Mark: 90 Marks

- ALL questions are MANDANTORY. You MUST solve.
- For molecular weight values refer to the attached periodic table.
- Conversion factors sheet is also attached to the exam.

Question 1 (35 Marks)

Choose the correct answer:

1. What basic SI unit is equal to $kg.m^2/s^2$
   (a) Joule
   (b) Pascal
   (c) Tesla
   (d) Watt

2. One leg of a mercury U-tube manometer is connected to a pipe containing water under a gage pressure of *100kPa*. The mercury in this leg stands *750 mm* below the water. What is the height of mercury in the other leg, which is open to the air? The specific gravity of mercury is *13.5*
   (a) 0.2 m
   (b) 0.5 m
   (c) 0.8 m
   (d) 1 m

3. What are the products of complete combustion of a gaseous hydrocarbon?
   (a) Carbon monoxide only.
   (b) Water, carbon monoxide, and carbon dioxide.
   (c) Carbon dioxide and water.
   (d) Carbon monoxide, water, and ammonia.

4. Why is excess air required in combustion?
   (a) It allows the reaction to occur stoichiometrically.
   (b) It reduces air pollution.
   (c) It reduces the heat requirements.
   (d) It allows complete combustion.

5. A sample of an unknown compound is found to be *49.3%* carbon, *9.6%* hydrogen, *19.2%* nitrogen, and *21.9%* oxygen by weight. What is its molecular formula?
   (a) C_4H_6NO
   (b) C_3H_6NO
   (c) $C_3H_6N_2O$
   (d) C_4H_5NO

6. Nitroglycerin is made by combining glycerol, nitric acid, and sulfuric acid. What are the minimum coefficients needed to balance the equation of this reaction?
   $--- C_3H_8O_3 + --- HNO_3 + --- H_2SO_4 \rightarrow --- C_3H_5N_3O_9 + --- H_2O + --- H_2SO_4$
   (a) 2, 6, 2, 2, 6, 2
   (b) 1, 3, 3, 1, 3, 2
   (c) 4, 2, 1, 1, 2, 4
   (d) 1, 3, 1, 1, 3, 1

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Chemical Engineering FE Exam is a critical milestone for aspiring chemical engineers in the United States. The Fundamentals of Engineering (FE) exam serves as the first step toward obtaining a professional engineering license. This exam tests the knowledge and skills that are fundamental to the practice of engineering, with a specific focus on chemical engineering principles. This article will delve into the significance of the FE exam, its structure, preparation strategies, and tips for success.

Understanding the FE Exam

The FE exam is designed to assess the knowledge and understanding of engineering principles that a recent graduate or a student nearing graduation should possess. It is administered by the National Council of Examiners for Engineering and Surveying (NCEES) and is the first of two exams required for licensure as a Professional Engineer (PE).

Purpose of the FE Exam

The primary objectives of the FE exam include:

1. Assessment of Knowledge: It evaluates a candidate’s understanding of core engineering concepts.
2. Licensure Requirement: Passing the FE exam is a prerequisite for taking the PE exam, which is essential for becoming a licensed professional engineer.
3. Establishing Competence: The exam serves to demonstrate a minimum competency in engineering principles, which is critical for public safety and welfare.

Eligibility Requirements

To sit for the FE exam, candidates must meet specific eligibility requirements, which typically include:

- Being enrolled in, or having graduated from, an accredited engineering program.
- Having relevant work experience, though this is not always mandatory for first-time takers who are recent graduates.

Exam Format and Content

The FE exam consists of two main components: a general section and a discipline-specific section. For chemical engineers, the discipline-specific section focuses on chemical engineering principles.

FE Exam Structure

- Length: The exam lasts for 6 hours, including a tutorial and a scheduled break.
- Number of Questions: There are 110 multiple-choice questions.

- Computer-Based Testing: The exam is administered as a computer-based test at Pearson VUE test centers.

Content Areas for Chemical Engineering

The FE Chemical Engineering exam is divided into several key content areas, which include:

1. Mathematics (approximately 15% of the exam)
- Algebra, calculus, differential equations, and statistics.

2. Chemical Engineering Principles (approximately 30% of the exam)
- Material and energy balances, thermodynamics, fluid mechanics, heat and mass transfer, chemical reaction engineering, and process control.

3. Chemistry (approximately 10% of the exam)
- General chemistry, organic chemistry, and physical chemistry principles relevant to chemical engineering.

4. Physics (approximately 10% of the exam)
- Mechanics, thermodynamics, and electricity and magnetism principles.

5. Engineering Economics and Management (approximately 5% of the exam)
- Cost analysis, project management, and economic decision-making.

6. Ethics and Professional Practice (approximately 5% of the exam)
- Engineering ethics, professional responsibility, and licensure.

7. Additional Engineering Topics (approximately 15% of the exam)
- Topics may include environmental engineering, safety engineering, and process design.

Preparing for the FE Exam

Preparation for the FE exam requires a strategic approach to studying and understanding the material. Here are some effective strategies:

Study Materials and Resources

1. Review Manuals: Consider using FE review manuals specifically tailored for chemical engineering.
2. Online Courses: Numerous online platforms offer courses and webinars focused on FE exam preparation.
3. Practice Exams: Taking practice exams can help familiarize candidates with the format and types of questions.

4. NCEES Resources: Utilize the official NCEES website for downloadable materials, sample questions, and exam specifications.

Creating a Study Plan

Developing a structured study plan is essential for effective preparation. Here’s how to create one:

1. Assess Your Knowledge: Identify your strengths and weaknesses in the various content areas.
2. Set a Timeline: Allocate specific periods for studying each topic, ensuring to cover all areas before the exam date.
3. Daily Goals: Set achievable daily or weekly study goals to keep you on track.
4. Regular Reviews: Schedule time for regular review sessions to reinforce knowledge and retention.

Tips for Success on Exam Day

The day of the exam can be stressful, but with the right approach, candidates can enhance their performance.

Before the Exam

- Rest Well: Ensure you get a good night’s sleep before the exam day.
- Familiarize Yourself with the Testing Center: Know the location and the rules of the testing center.
- Prepare Necessary Materials: Bring an approved calculator, identification, and any other required materials.

During the Exam

1. Read Instructions Carefully: Before starting, take a moment to read all provided instructions.
2. Manage Your Time: Keep track of the time and allocate it wisely among questions.
3. Answer What You Know First: Start with questions you feel confident about to build momentum.
4. Mark Uncertain Questions: If unsure about a question, mark it and return later if time permits.

After the Exam

- Reflect on the Experience: Take notes on what worked and what didn’t for future reference.
- Anticipate Results: Understand that results are typically available within a few weeks.

Conclusion

The Chemical Engineering FE exam is an important step for engineering graduates aiming to become licensed professionals. Adequate preparation, understanding the exam structure, and effective study strategies can significantly enhance the chances of success. By investing time and effort into studying and familiarizing themselves with the exam format, candidates can approach this challenge with confidence, paving the way for their future careers in chemical engineering.

Frequently Asked Questions

What is the format of the Chemical Engineering FE Exam?

The Chemical Engineering FE Exam consists of 110 multiple-choice questions, divided into two sections: 80 questions on chemical engineering topics and 30 questions on general engineering topics.

What topics are covered in the Chemical Engineering FE Exam?

The exam covers a range of topics including material balances, thermodynamics, fluid mechanics, heat and mass transfer, chemical reaction engineering, process control, and safety.

How should I prepare for the Chemical Engineering FE Exam?

Preparation can include reviewing relevant textbooks, taking practice exams, utilizing online resources, joining study groups, and considering review courses specifically for the FE Exam.

What is the passing score for the Chemical Engineering FE Exam?

The passing score for the FE Exam varies by state and is determined by the

National Council of Examiners for Engineering and Surveying (NCEES). Generally, a scaled score of about 70 is considered passing.

Can I take the Chemical Engineering FE Exam before graduating?

Yes, you can take the Chemical Engineering FE Exam as a senior in your undergraduate program or even after completing your degree but before obtaining your engineering license.

How often is the Chemical Engineering FE Exam offered?

The Chemical Engineering FE Exam is offered year-round at Pearson VUE test centers, allowing candidates to schedule their exam at their convenience.

What resources are recommended for studying for the Chemical Engineering FE Exam?

Recommended resources include the NCEES FE Reference Handbook, exam review books, online prep courses, and practice problem sets available from various educational platforms.

Chemical Engineering Fe Exam

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