

**Study Guide
for
Nuclear Chemistry Technician**

**Test No. 2784
Forms A and B**

**Performance Assessment Services
Southern California Edison Company**

NEW 030309

Introduction

The Nuclear Chemistry Technician Test is a job knowledge test designed to cover the major knowledge areas necessary to perform the job. This *Guide* contains strategies to use for taking tests and a study outline, which includes knowledge categories, major job activities, and study references.

Test Scheduling

Employees who apply for positions, bids, and transfers requiring testing before March 9, 2009, will be scheduled for testing by their Supervisor through Human Resources. For those who apply after March 9, 2009, both the employee and their Supervisor will be notified of a scheduled test date by Human Resources. Test times and dates for positions requiring testing will be specified in the bid/transfer/requisition/job posting. Employees should be prepared to test on the specified dates. Only employees who apply for positions requiring testing, and who meet basic qualifications, will be invited to test. Applicants will be scheduled through the recruiter. If you have any questions, please call 626-302-9830.

Test Session

It is important that you follow the directions of the Test Administrator *exactly*. If you have any questions about the testing session, be sure to ask the Test Administrator before the testing begins. During testing, you may not leave the room, talk, smoke, eat, or drink. Since some tests take several hours, you should consider these factors before the test begins.

All questions on this test are multiple-choice with four possible answers. Prior to March 9, 2009, your answers to the questions are indicated by filling in a circle on an answer sheet with a special mark-sense pencil. For your answers to be read accurately by the scanner, you must fill in the circles completely and erase completely any answer you wish to change. After March 9, 2009 you will take the exam on a computer. For more information on this, please see the next section of this study guide, Computer Based Testing.

The test has a three-hour time limit, and a non-programmable scientific calculator is allowed when taking this test. Calculators will be provided by the Test Administrator, and will be one of the following three models: Casio fx-250HC, Texas Instruments TI-30XA, TI 36-X.

You will receive a Test Comment form so that you can make comments about test questions. Write any comments you have and turn it in with your test when you are done.

Study Guide Feedback

At the end of this *Guide* you have been provided with a Study Guide Feedback page. If a procedure or policy has changed, making any part of this *Guide* incorrect, your feedback would be appreciated so that corrections can be made.

Computer Based Testing

Effective **March 9, 2009**, all knowledge tests will be administered on the computer. This information will help prepare you for a knowledge test taken on or after **March 9, 2009**.

Taking an SCE knowledge test on the computer is simple. You do not need any computer experience or typing skills. You will only use the keyboard to enter your candidate ID and password. You'll answer all questions by pressing a single button on the mouse.

Log in Screen

You will be seated at a testing station. When you are seated, the computer will prompt you to enter the candidate ID and password you received in your invitation e-mail. You **MUST** have your candidate ID and password or you will be unable to take the test. Once you have confirmed your identity by entering this information, you will see a list of tests available to you.

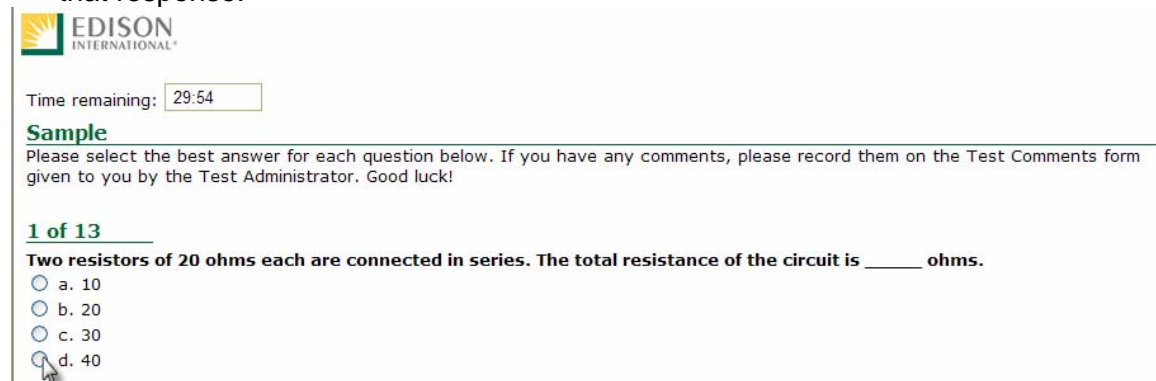
Sample/Tutorial

Before you start your actual test, a Sample/Tutorial Test is provided to help you become familiar with the computer and the mouse. From the list of exams that appear when you complete the log in, you will select Sample/Tutorial. You will have up to 10 minutes to take the Sample/Tutorial Test. The time you spend on this Sample Test DOES NOT count toward your examination time. Sample questions are included so that you may practice answering questions. In the Sample/Tutorial Test, you will get feedback on your answers. You will not receive feedback on your actual test.

Example

During the test, to answer each question, you should move the mouse pointer over the circle (radio button) next to the answer of your choice, and click the left mouse button. The amount of time you have remaining to take the test will always be shown in the top left corner of the screen. A sample is show below:

1. When you begin the test, you can see the total time allowed for completion displayed at the top of the screen. You can scroll up to see that information at any time during the test.
2. In order to answer each question, first read the question and determine the response that best answers the question. Put the mouse pointer directly over the circle corresponding to that response.



The screenshot shows the Edison International test interface. At the top left is the Edison International logo. Below it, a timer displays "Time remaining: 29:54". A section titled "Sample" contains the instruction: "Please select the best answer for each question below. If you have any comments, please record them on the Test Comments form given to you by the Test Administrator. Good luck!". Below this, it indicates "1 of 13" questions. The question text is "Two resistors of 20 ohms each are connected in series. The total resistance of the circuit is _____ ohms." and there are four radio button options: a. 10, b. 20, c. 30, and d. 40. A mouse cursor is pointing at option d.

3. While the pointer is over the circle corresponding to the best answer, click the left mouse button.



Click the left button when the pointer icon is over your answer choice.

- The answer you selected should now have a green dot in the circle. If you need to select an alternate answer, simply move the pointer over that circle, and click again.



Time remaining:

Sample

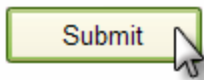
Please select the best answer for each question below. If you have any comments, please record them on the Test Comments form given to you by the Test Administrator. Good luck!

1 of 13

Two resistors of 20 ohms each are connected in series. The total resistance of the circuit is _____ ohms.

- a. 10
- b. 20
- c. 30
- d. 40

- You can change your answers at any time during the test until the time runs out, or you click the "Submit" button.



Test Taking Strategies

Introduction

The Nuclear Chemistry Technician Test contains multiple-choice questions. The purpose of this section is to help you to identify some special features of a multiple-choice test and to suggest techniques for you to use when taking one.

Your emotional and physical state during the test may determine whether you are prepared to do your best. The following list provides common sense techniques you can use before the test begins.

Technique

Remarks

Be confident

- If you feel confident about passing the test, you may lose some of your anxiety.
- Think of the test as a way of demonstrating how much you know, the skills you can apply, the problems you can solve, and your good judgment capabilities.

Be punctual

- Arrive early enough to feel relaxed and comfortable before the test begins.

Concentrate

- Try to block out all distractions and concentrate only on the test. You will not only finish faster but you will reduce your chances of making careless mistakes.
- If possible, select a seat away from others who might be distracting.
- If lighting in the room is poor, sit under a light fixture.
- If the test room becomes noisy or there are other distractions or irregularities, mention them to the Test Administrator *immediately*.

Budget your time

- Pace yourself carefully to ensure that you will have enough time to complete all items and review your answers.

Read critically

- Read all directions and questions carefully.
- Even though the first or second answer choice looks good, be sure to read all the choices before selecting your answer.

Make educated guesses

- Make an educated guess if you do not know the answer or if you are unsure of it.

Changing answers

- If you need to change an answer, be sure to erase your previous answer completely. On the computer, be sure that the new answer is selected instead of the old one.

Return to difficult questions

- If particular questions seem difficult to understand, make a note of them, continue with the test and return to them later.

Doublecheck mathematical calculations

- Use scratch paper to double check your mathematical calculations.

Review

- If time permits, review your answers.
- Do the questions you skipped previously.
- Make sure each answer bubble is *completely* filled in. Erase any stray marks on your answer sheet. When testing on the computer, make sure each question has a green dot next to the correct answer.

Remember the techniques described in this section are only suggestions. You should follow the test taking methods that work best for you.

Study Guide Outline

Job Knowledge Categories and Study References

Below are the major job knowledge categories covered on the test, with references you can access to help you prepare.

A. General Principles of Chemistry

Knowledge of basic general principles of chemistry, which includes chemical symbols and formulas, physical properties of gases, liquids and solids, chemical nomenclature (acids, bases, and salts) and solubility products. In addition, math (scientific notation and algebra), pH theory, conductance theory, thermodynamics, acid/base theory, oxidation/reduction, chemical equilibrium, electrochemistry/corrosion, ion exchange theory and hydrolysis are also required.

Schaum's Outline of Beginning Chemistry, 2nd edition, David E. Goldberg, McGraw-Hill, 1999.

Schaum's Outline of College Chemistry, 8th edition, Jerome R. Rosenberg and Lawrence M. Epstein, McGraw-Hill, 1996

These texts sell for about \$12 and are available in university, college and technical bookstores. General bookstores, like B. Dalton, Barnes and Noble, Borders, Waldenbooks, and Amazon.com, often stock these books.

Although Schaum's contains some discussion of concepts and theory, the texts are mainly concerned with problem solving. Detailed, worked-out sample problems and additional practice problems with answers are a major part of the texts.

An applicant wishing a more thorough explanation of the theory and principles of chemistry should consult any general high school or college chemistry text.

B. Radiation Theory and Isotopic Analysis Procedures

Knowledge of basic radiation protection procedures with a basic understanding of physics/nuclear physics, reactor theory and design, and atomic structures. Includes radiochemical analysis theory and techniques, radiation effluent monitoring theory and techniques and radioactive waste handling and disposal. Also includes radioisotopic detection instrumentation theory and techniques, radiation dose rate instrumentation, and the use of the periodic table.

Basic Radiation Protection Technology, Daniel A. Golnick, ISBN 0-916319-01-7.

Radiation Detection and Measurement, Glenn F. Knoll, ISBN 0-471-49545-X.

C. Chemical Analysis and Laboratory Techniques

Knowledge of standard chemistry procedures and technical specifications. Includes standards and reagent preparations, chromatographic analysis/ instrumentation, conductometric analysis/instrumentation, spectrophotometric analysis/instrumentation, gravimetric analysis, volumetric analysis/ techniques, pH analysis/techniques, and safe laboratory procedures.

Principles of Instrumental Analysis, Douglas A. Skoog, ISBN: 0030020786

D. Knowledge of Plant Systems and Equipment

Knowledge of basic piping and instrumentation diagrams/symbols, operation of in-line chemical analyzers, and the care and maintenance of lab analytical equipment/instrumentation. Includes the use of air and water monitoring equipment, water treatment system chemistry procedures and a general understanding of basic PWR design and secondary system operation.

Nuclear Energy - An Introduction to the Concepts, Systems, and Applications of Nuclear Processes, Raymond Murray, ISBN: 075067136X

Another resource is the web site: <http://www.nucleartourist.com/systems/systems.htm>

