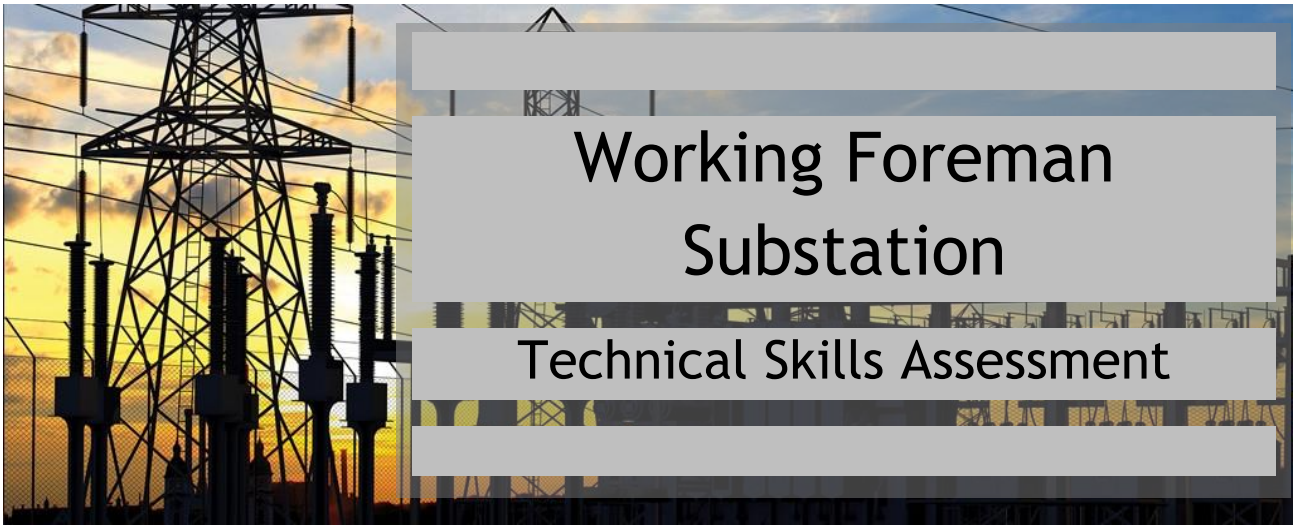


1/19/2018

# Welcome!

**Congratulations**! You are taking the first step to ensure your success on the tests and ultimately in your career at San Diego Gas & Electric (SDG&E). The tests used at SDG&E are designed to give you the opportunity to make the best use of your skills. This booklet will give you information about the procedures used to select employees who are qualified and likely to be successful in the job. These procedures include a test which indicates how successful you are likely to be in the job for which you will apply.

This booklet gives you some tips for preparing for the test, as well as suggestions on how to do your best. It also includes sample items that will help you understand the format of the actual test.

**GOOD LUCK**!

# How to Use This Guide

This manual is divided into three sections aimed at helping you become more successful on your tests.

- General test taking strategies applicable to all tests
- A brief discussion of the current test
- Sample questions

If you are a *first time* test taker, take time to read through this entire manual and familiarize yourself with the tests you will be taking. Also provided are book recommendations to assist you in studying for your exams.

If you are *retaking* a test, pay attention to the general test taking strategies, work through the sample problems, identify your weaknesses, and obtain one of the resources described at the back of this manual. If you feel you need to "brush-up" on a subject there are books to help you do that as well.

# About Job Knowledge Tests

SDG&E uses job knowledge tests for people applying to certain jobs. These tests measure relevant job knowledge and skills in areas that are related to successful performance in the job in question.

Job knowledge tests are relevant for positions where specific knowledge is needed "on day 1" coming into the role. In addition, research has shown that performance on job knowledge tests is predictive of successful performance on the job.

# General Test Taking Strategies

The following discussion includes tips for taking a wide variety of tests and should be practiced alongside the tips provided for the individual test (provided in the following section).

### Before the Test

- **Pace yourself.** If you choose to prepare for your test, review the material (books, practice problems, or study guide) in several relatively short periods rather than a few long periods. Studying in several 30-60 minute sessions allows you to absorb the material more easily than if you were to cram large quantities of information at once.

### When You Begin

- **Be positive!** The tests are not designed to trick you or be unnecessarily difficult. In fact, if you've taken other tests in school or at work, you'll probably find these very familiar. Start with a positive attitude and don't give up! Try to remember the hints that are outlined in this booklet and don't get discouraged if there are questions for which you don't know the answer. Remember, each question counts the same as any other question. If you can't answer one, don't let that discourage you for the next items. Begin each section/test with the same positive attitude. No one is expected to get every answer right!

- **Read the directions and pay close attention to all test instructions!** Sometimes we assume we know what type of question we are answering, but many times test takers get answers wrong because they did not read the directions. An example of this would be the differences between *mark all that apply, answer only one,* and *mark the one that does not belong.*

- **Relax.** Feeling high amounts of stress or tension will cause you to forget what you know or think irrationally. Ways to reduce feelings of stress include preparing in advance, not talking with others who are stressed about the test immediately beforehand, making sure you understand the directions, and reviewing this guide.

**During the Test**

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- **Complete the easiest questions or sections first.** If the test allows for it, begin the test by identifying the areas in which you are strongest while remembering to mark the questions you skip. Complete these sections first and then move to the more difficult areas. Don't spend too much time on any one question – since any question is worth the same in scoring, it is always to your advantage to complete as many questions as you can!

- **Mark questions you skip for easy relocation.** If the test allows for it, and you find yourself in a situation where you do not understand the nature of the question or simply don't know the answer, mark it and return to it later. Surprisingly, this is one of the most common mistakes made by test takers. Spending valuable time on a test item that you cannot answer simply gives you less time to complete other items you may know. It is far better to mark that item and continue forward, coming back to that item if the test format and time permit at the end. Marking your answer sheet when you skip an item can help you keep track of where you are on the test – some candidates have lost valuable time when they did not mark a skipped item and got off-track.

- **Read each question carefully.** After reading each question, make sure you understand it clearly.

- **Do not make RANDOM guesses, but narrow down for the correct response.** Try to eliminate at least one wrong answer before guessing. If you are given four choices and randomly guess, you only have a 25% chance of guessing the right answer—or a 75% chance of guessing the WRONG answer. Further, if you can eliminate just one wrong answer you have boosted your chances to 33%. Obviously, if you can eliminate two wrong answers your chances have gone up to 50%. When all else fails, and you must make guesses:

    - **Be aware of key words:** "always," "never," "all," or "none." Consider these options carefully.
    - **Trust your "gut":** Usually your first reaction is right.

- **Be aware of being tempted to pick wrong answers.** There are answers that test developers have created based upon simple common errors such as replacing the word "their" with "there." Take your time to work through the problem if it involves numbers and to read actively if the question involves grammar and spelling situations.

- **Leave time for review.** If the test allows for it, and you complete the test before the time is up, don't stop working - review your answers! Don't look for patterns in the responses – the tests have been professionally developed and don't necessarily have the same number of "A," "B," or "C" answers. If you find that you have answered mostly "A," for example, trust your instincts and don't assume that it must be wrong. Research has shown that many people who change answers during the review change right answers to wrong ones. Changes should be made only when you are certain the original answer is wrong. You can also use any extra time to make certain your answers are entered darkly and clearly. Be sure all your answer changes are erased completely and there are no stray marks on the answer sheet.

## Strategies for Various Question Types

### True – False

- If any part of the statement is false, the entire statement is false.
- Words such as "always," "never," "all," and "none" are often, but not always, signals that a statement is false.

### Multiple Choice

- Read the entire question and try to answer it *before* looking at your options.
- Even if you think you know the answer be sure to read through all of your options.
- If you are uncertain, begin by eliminating answers that are wrong, increasing your chances of being right.

# Test Preparation Guide

The Working Foreman Substation Technical Knowledge Test contains 60 multiple-choice items. The time limit for this test is 180 minutes. This is a closed book test, and calculators are not permitted.

## Information about test content

The following job knowledge and skill areas listed below are sampled by the test. The test does NOT necessarily include questions from ALL areas, but this list represents the possible areas that will be tested for on the test.

### A. Electrical and Electronic Concepts

1. Substation voltages
2. AC/DC fundamentals
3. Load/generation/calculations
4. Neutral current calculations
5. Color codes
6. Resistors, inductors, and capacitors
7. Single- and three-phase values of power system
8. SCADA
9. Standard Phasing Convections (Delta Y, Y Delta, Y-Y, Y-Y Delta, Y Delta Zig Zag)
10. Troubleshooting control circuits

### B. Print Reading

1. One-line transmission/distribution system diagram
2. Wiring and ladder diagrams
3. System flow sequence
4. Relay schematic and data acquisition configuration
5. IEEE/ANSI device numbering
6. Structural

### C. Installation

1. Wiring
2. Ampacity determination
3. Overcurrent protection
4. Equipment grounding
5. Switchgear arrangement
6. Torque requirements
7. Insulation systems
8. Cable installation
9. High voltage equipment
10. Control equipment

### D. Testing

1. Test equipment: Doble, Breaker analyzer, Profiler, SFRA, Ductor, hi-pot, TTR, SF6 tester, Vanguard megger
2. Substation inspection
3. Timing test
4. High potential testing
5. Circuit breakers
6. Batteries
7. Ground
8. Insulating liquid/tests
9. Transformers/maintenance/oil sampling
10. Frequency/power transducers
11. Switchgear
12. Lighting circuits
13. KV booster/LTC maintenance
14. PT, CPT, and CT circuits

15. Torque requirements
16. Insulation systems
17. “Automatic Throw-over” systems
18. Metering circuits
19. Analyzing results

## E. Grounding

1. System faults/ground-fault protection
2. Requirements for special locations
3. Temporary/permanent systems
4. Equipment hazards
5. Requirements for conductors, electrodes, enclosures
6. Proper applications
7. EPZ

## F. Construction and Maintenance

1. Troubleshooting methods
2. Switching procedures
3. Read and configure relay settings and events
4. Air and disconnect switch
5. Breakers and transformers
6. Switchgear
7. Batteries
8. Tripping curve interpretation
9. Protective devices
10. Regulator maintenance
11. Process SF6 gas
12. Voltage control equipment
13. Insulator washing

# Sample Test Items

The following sample items below are intended to give the test taker an idea of what to expect on the test. They serve as a tool for the test taker to determine the types and format of the questions that will be asked of them on the examination. This is only a sample of the content, and does not include every content domain that will be covered on the test, nor does it necessarily represent the difficulty level of the items on the test.

**A. Electrical and Electronic Concepts**

1. If the current is 12 amperes and voltage is 15 volts, what is the resistance?

A. 0.75 ohms
B. 0.80 ohms
C. 0.90 ohms
D. 1.25 ohms

**B. Print Reading**

2. The symbol shown is a

A. a diode
B. a switch
C. a resistor
D. a capacitor

**C. Installation**

3. If the diameter of the branch conductor is doubled, the resistance of the conductor will

A. remain the same
B. increase
C. decrease
D. reduce in half

**D. Testing**

4. What can cause an excessive voltage drop?

A. Excessively large size wires.
B. Too much insulation on the wire.
C. Excessive resistance in any part of the circuit.
D. A short bypassing the load being tested.

**E. Grounding**

5. To be effective, a grounding system must limit the voltage on the electrical system and protect it from all of the following except _____.

A. under-voltage conditions
B. voltage surges higher than that for which the circuit was designed
C. exposure to lightning
D. an increase in maximum potential ground due to abnormal voltages

**F. Construction and Maintenance**

6. Which test should NOT be performed on a Current Transformer?

A. Excitation
B. Interfacial Tension
C. Saturation
D. Insulation Resistance

## Answers to Sample Items

| | | |
|---|---|---|
| 1. | D | 1.25 ohms |
| 2. | C | a resistor |
| 3. | C | decrease |
| 4. | C | Excessive resistance in any part of the circuit. |
| 5. | A | under-voltage conditions |
| 6. | B | Interfacial Tension |

# Further Resources

## General Test Taking Strategies


Casbarro, J. (2003). Test Anxiety & What You Can Do About It. National Professional Resources, Inc.

Driscoll, R. (2003). Tame test anxiety: Proven Anxiety Reduction Training [Abridged Audio CD]. Frontiers Press.

Flippo, R. F. (2000). Testwise (2nd Edition). Torrance, CA: Good Apple/Frank Schaffer Publications.

Gilbert, S. D. (1998). How To Do Your Best on Tests. HarperTrophy.

Hammer, H. (1998). ARCO General Test Practice for 101 U.S. Jobs (4th ed.). New York: Macmillan Publishing Company, Incorporated.

Johnson, S. (1997). Taking the Anxiety Out of Taking the Test: A Step-By-Step Guide. New Harbinger Publications.

Lawler, J., & Powers, R. (2003). ASVAB for Dummies (Chapter 3: Test-taking and Study Techniques). New York, NY: Wiley Publishing, Inc.

Meyers, J. N. (2000). The Secrets of Taking Any Test: Learn the Techniques Successful Test-Takers Know. Garden Grove, CA: LearningExpress, LLC.

Na, G. F. (1999). Guide to Standardized Test Preparation. Globe Fearon.

Newman, E. (1996). No More Test Anxiety: Effective Steps for Taking Tests & Achieving Better Grades (1st Ed. w/ Audio CD). Learning Skills Publications, LLC.

Research and Education Association Staff (1992). REA's Math Builder for Admission and Standardized Tests. Piscataway, NJ: Research and Educational Association.

Rozakis, L. (2002). Test Taking Strategies & Study Skills for the Utterly Confused. New York: McGraw-Hill.

## Test Content Resources

| Reference | Location |
|---|---|
| **Basic Electricity Books** | |
| 1. Holt, M. (2011). *Basic electrical theory (3rd)*. Leesburg, FL: Mike Holt Enterprises, Incorporated. | Skills |
| 2. Mileaf, H. (1998). *Electricity one-seven (3rd)*. New York: NY: Pearson. | Skills |
| 3. Singer, B., Forester, H., and Schultz, M. E. (1999). *Basic mathematics for electricity and electronics (8th)*. New York, NY: McGraw-Hill Higher Education | Skills |
| 4. *Basic electrical power distribution (Vol 1)*. (1958). New York, NY: John F. Rider Publishing. | Skills |
| 5. Herman, S. L. (2012). *Alternating current fundamentals (8th)*. Boston, MA: Cengage Learning. | Skills |
| *book references above are offered through the third year night school program | |
| **Training Programs** | |
| 6. Lab volt training program | Skills |
| 7. Third year night school program | Skills |
| 8. Journeyman training program | Skills |

## Online Resources

**Company Standards**

9. Electric Standard Practices and Procedures
   http://infoweb2.sdge.com/departments/projmgmt/docs/esp/esp_index.htm
10. Electric Operations Standards/Procedures Index
    http://powerup.sdge.com/electricoperationsindex.cfm
11. Substation engineering field requests
    http://powerup.sdge.com/departments/substation/documents.cfm

**Safety**

12. Website: http://safety.sempra.com
13. Employee Safety Handbook
    http://doclib.sempra.com/sdge/Default.aspx?Company=SDG%26E&BinderID=1318&DocStatus=Active

**Kearny Web Site**

14. http://utilinet.sempra.com/departments/kearny/

    Standard Operating Procedures

    - Substation entry (SUB 4010 and 4025)
    - Substation grounding standards
    - Substation standard work practices