

# **STUDY GUIDE SUPERVISING TEST TECHNICIAN KNOWLEDGE TEST**

**TEST #2884**

## INTRODUCTION

The 2884 Supervising Test Technician Test is a job knowledge designed to cover the major knowledge areas necessary to perform the Supervising Test Technician job. This guide contains strategies to use for taking tests and a study outline, which includes knowledge categories and study references.

## 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.

Mobile phones or other electronic equipment will NOT be allowed in the testing area.

All questions on this test are multiple-choice format and have four possible answers. All knowledge tests will be taken on the computer. Consult the following link and click on Computer Based Testing for more information: [www.edison.com/studyguides](http://www.edison.com/studyguides)

The test has a 3-hour time limit.

A scientific calculator will be provided for you to use during the test. You will be given the choice between the following calculators: Casio fx-115es plus or Texas Instruments TI-36X.

You will NOT be able to bring or use your own calculator during testing.

You will have an opportunity to complete a test comment form during the testing session, should you have comments about test questions.

## STUDY GUIDE FEEDBACK

At the end of this Guide you have been provided with an Information 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.

## TEST TAKING STRATEGIES

## **TEST TAKING STRATEGIES**

### **INTRODUCTION**

The test contains multiple-choice questions. The purpose of this section is 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.

### **CONFIDENCE**

If you feel confident about your physical abilities, 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.

### **PUNCTUALITY**

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

### **CONCENTRATION**

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.

### **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 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.

## **DOUBLE CHECK MATH 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 multiple choice question has your correct answer selected.

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

## **JOB KNOWLEDGE CATEGORIES**

Below are the major job knowledge areas (topics) covered on the 2884 Supervising Test Technician Test. Listed next to each knowledge category is the number of items on the exam that will measure that topic. You can use this information to guide your studying. Some exams also contain additional pretest items. Pretest items will appear just like all of the other items on your exam, but they will not affect your score. They are an essential part of ensuring 2884 Supervising Test Technician Test remains relevant to successful performance of the job.

There is a total of 71 items on the 2884 Supervising Test Technician knowledge test and the passing score is 76%. This score was determined during the test validation process.

## **ELECTRICAL, ELECTRONIC, MECHANICAL THEORY, AND MATHEMATICS (17 ITEMS)**

Knowledge of advanced electrical and electronic theory (AC/DC theory, proper electrical wiring techniques, digital electronics, advanced phasors, etc.). Knowledge of applied mechanical theory as in the knowledge of basic mechanical aptitude. Also, knowledge of algebra, trigonometry, and phasoring.

## **REFERENCES**

AC Theory and Phasor Analysis

Basic Electricity 1-7 (book)

Electrician's Handbook

Engineering Standards (ECS)

Substation Training School Test Manual: HCB Relay Manual

Substation Training School Test Manual: Transformer Theory Manual

## **TEST METHODS AND INSTRUMENTS (21 ITEMS)**

Knowledge of types and applications of various test methods to install, test, maintain, and repair station equipment. Test methods include, but not limited to, primary push, impedance test, wire checking, relay testing, in-service testing, and dynamic relay testing. Knowledge of types and applications of high voltage test equipment, relay test equipment, megger, TTR, resistance bridge, oscilloscope, multimeters, power analyzer, frequency selectable voltmeter, signal generators. Knowledge of SCE policies, procedures, and standards; knowledge of administrative procedures (e.g. necessary for weekly/monthly/annual SCE inspection and maintenance; to complete monthly vehicle inspections; to record maintenance, test, and operations events in logbook).

## **REFERENCES**

AC Theory and Phasor Analysis

Doble Power Factor Training Manual

Engineering Standards

Maintenance Inspection Manual (MIM)

Power Line Carrier and Communications Technical Manual

Substation Operator's Manual (SOM)

Substation Training School Test Manual: Bank Differential Relay Manual

Substation Training School Test Manual: Differential Relay Manual

Substation Training School Test Manual: Distance Relay Manual

Substation Training School Test Manual: Ground Relay Manual

Substation Training School Test Manual: Initial and Routing Testing Manual

Substation Training School Test Manual: Metering Manual

## **STATION EQUIPMENT (9 ITEMS)**

Knowledge of types and applications of recorders, metering and control equipment, instrumentation and alarms, instrument transformers, DC Systems, and circuit breakers, transformer and tap changers, voltage regulators, capacitor banks, reactors and synchronous condensers. Also knowledge of electromechanical and solid-state equivalent and microprocessor based relay testing and calibration.

## **REFERENCES**

### **AC THEORY AND PHASOR ANALYSIS**

Maintenance Inspection Manual (MIM)

Substation Training School Test Manual: Ground Relay Manual

Substation Training School Test Manual: Bank Differential Relay Manual

Substation Training School Test Manual: Differential Relay Manual

Substation Training School Test Manual: Ground Relay Manual

Substation Training School Test Manual: Transformer Theory and Calculation Manual

## **ENGINEERING STANDARDS (6 ITEMS)**

Knowledge and understanding of drafting and engineering standards. These include SCE substation and facilities, types and construction of substation equipment, SCE voltage classification systems, types and applications of schematics and design, drafting methods and symbols.

## **REFERENCES**

AC Theory and Phasor Analysis

Engineering Standards

Electrical Design Station Layout 41-30-01

Electrical Design Station Layout 63-18-02

Maintenance Inspection Manual (MIM)

Substation Operator's Manual (SOM)

## **SYSTEM OPERATIONS AND MOVE PROGRAMS (8 ITEMS)**

Knowledge of types and applications of proper switching techniques including the ability to verify proper isolation and grounding of electric equipment; types and applications of clearances, tags, warning blocks, intercompany clearances, and switching orders. Knowledge of procedures and requirements for submitting switching/clearance requests, paralleling station transformers, and performing pre/post-switching techniques. Also general knowledge and understanding of Substation Operations.

## **REFERENCES**

Substation Training Operators Manual

Substation Training School Test Manual: Bus Differential Relays

## **SAFETY PROCEDURES (8 ITEMS)**

Knowledge of and ability to apply SCE safety procedures and requirements (Accident Prevention Manual) and CAL OSHA requirements. Knowledge and application of safe operation of tools, equipment, and procedures to include grounding requirements, personal protective equipment, procedures for working in proximity to energized equipment, live line tools, voltage testers, barricades and warnings and practices of emergency communications.

## **REFERENCES**

Accident Prevention Manual (APM) Rule 708d, 713b, 714, and P-18

OSHA Standard 1910.137

Substation Grounding Manual

Substation Training Operators Manual

Substation Training School Test Manual: Transformer Theory and Calculation Reference Manual

## **COMPUTER KNOWLEDGE (2 ITEMS)**

Basic knowledge of computer hardware and software such as PROTEST, SEL, and Windows-based relay-interface programs.

References

SEL Manual

Testman Module

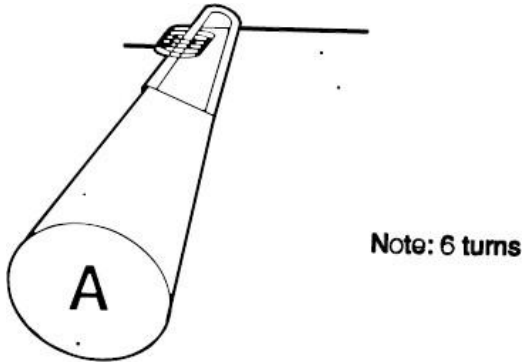


## **SAMPLE QUESTIONS FOR THE JOB KNOWLEDGE TEST**

The following are samples of the type of questions, arranged by knowledge area that you will encounter in the knowledge test. An answer page follows the questions.

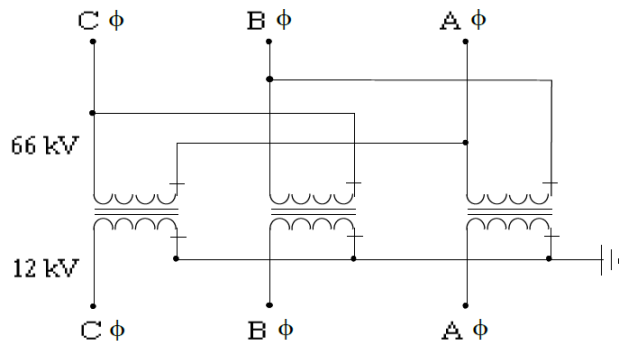
- 1) Given a three phase 66/16KV 28MVA transformer, what is the full load line current on the secondary?
  - a) 245 amps
  - b) 1010 amps
  - c) 583 amps
  - d) 424 amps
  
- 2) When submitting an outage for a 66kV ISO line, the correct lead time is:
  - a) 5 days
  - b) 10 days
  - c) 14 days
  - d) 30 days
  
- 3) Using Protest, what macro would you use to test the Mho circle of a distance relay?
  - a) LRAMPI
  - b) TIMEI
  - c) TIMEV
  - d) ZPXBOI

- 4) A clamp-on ammeter is connected as shown below and reads 10 amps. What is the current in the conductor?



- a) 1.67A  
b) 3.33A  
c) 5.00A  
d) 15.00A
- 5) Three single-phase 5000 KVA transformers are connected in a bank delta-delta. One unit fails, is cut in the clear, and the load is picked up. What is the capacity of the remaining two units?
- a) 5,770 KVA  
b) 6,250 KVA  
c) 8,655 KVA  
d) 10,000 KVA

6) Phasor the 66/12 kV three-phase transformer bank. The 12-kV phase-to-neutral is:



Note: Edison A-C-B Rotation

- a) in phase with the 66kV phase-to-neutral
  - b) 180° out-of-phase with the 66-kV phase-to-neutral
  - c) leading the 66-kV phase-to-neutral by 30°
  - d) lagging the 66-kV phase-to neutral by 30°
- 7) What kind of software would you use to run a double test set?
- a) Protest
  - b) Hyperlink
  - c) ASE2000
  - d) 5020

## **ANSWERS TO SAMPLE QUESTIONS FOR THE JOB KNOWLEDGE TEST**

- 1) B
- 2) D
- 3) D
- 4) A
- 5) C
- 6) D
- 7) A

## **STUDY GUIDE FEEDBACK**

Please use this page to notify us of any changes in policies, procedures, or materials affecting this guide. Once completed, return to:

Southern California Edison, Corporate Testing

[EdisonTesting@sce.com](mailto:EdisonTesting@sce.com)