SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead®

Study Guide

For

Operator Mechanic Knowledge Test

TEST NUMBER: 2468

INTRODUCTION

The 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 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.

The test has a three hour time limit.

A non-programmable basic calculator will be provided to you during testing.

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.

ASSESSMENT TAKING STRATEGIES

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.

CONFIDENCE

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.

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 tasks/functions.

READ CRITICALLY

Read all directions and questions carefully.

Remember that the techniques described in this section are only suggestions. You should follow the test taking methods that work best for you. If particular questions seem difficult to understand, make a note of them, continue with the test and return to them later.

MAKE EDUCATED GUESSES

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

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 AND STUDY REFERENCES

Below are the major job knowledge areas (topics) covered on the test and the associated study references. 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 the test remains relevant to successful performance of the job.

There are a total of 87 items on the test. The passing score is 70%.

Electrical, Mechanical, Steam Operation, and Hand Tools (37 items)

Understanding of AC/DC theory, single line and piping and instrumentation drawings (P&ID's), electrical symbols, use of basic electrical test instruments (e.g., multimeter), basic math (e.g., multiplication, division), general principles of physics and water chemistry including thermal dynamics and fluid flow. Electrical transmission and generating system operations including alternate and parallel routes, system power demand, generator output, and the total effect of changes in plant operation on KVA output. The names of various tools used for the maintenance of generating station equipment, their function, care and handling.

- ✓ Herman, S. L. (2009). Delmar's Standard Textbook of Electricity. (4th Edition). Delmar Publishing.
- ✓ Kemp, A. W. (2008). Industrial Mechanics. (2nd Edition). ATP publications.
- ✓ Lehrman, R. L. (1998). Physics The Easy Way. (3rd Edition). Barron's Educational Series Inc.
- ✓ Prindle, K, & Prindle, A. (2003). Math the Easy Way. (4thEdition). Barron's Publications.
- ✓ Steingress, F. M., Frost, H. J., & Walker, D. R. (2009). High Pressure Boilers. (4th Edition). American Technical Publisher's Inc.
- ✓ Walker, J. R. (2004). Machining Fundamentals. (8th Edition). Goodheart-Willcox Co.
- ✓ Woodruff, E., Lammers, H., & Lammers, T. (2004). Steam Plant Operation. (8th Edition). McGraw-Hill Publishing.

Inspection Criteria and Equipment Function and Terminology (27 items)

Understanding of the standards of associated with physical equipment integrity, instrumentation for operational checks, and regulations; as well as the restrictions that apply to steam plant and combustion turbine operation and maintenance procedures. Knowledge related to purpose and function of steam plant equipment and electrical generation equipment. Included is a basic knowledge of the terminology of various tools and equipment used to perform maintenance activities at a power generating station.

- ✓ Alche. (2007). Positive Displacement Pumps: A Guide to Performance Evaluations. Wiley.
- ✓ Beaty, W. H. (2000).Handbook of Electric Power Calculations. McGraw-Hill.
- ✓ Kehlhofer, R., Hannemann, F., et al. (2009). Combined-Cycles Gas and Steam Turbine Power Plants. PennWell.
- ✓ Kemp, A. W. (2008). Industrial Mechanics. (2nd Edition). ATP publications.
- ✓ McDonald, J. D. (2007). Electric Power Substations Engineering. (2nd Edition). CRC Press, New York.

- ✓ Oberg, E., & Jones, F. D. et al. (2008). Machinery's Handbook. (28th Edition). Industrial Press Inc.
- ✓ Reference 3.
- ✓ Slade, P. G. (2008). The Vacuum Interrupter: Theory, Design, and Application. CRC Press.
- ✓ Thomas, C. E. (2010). Process, Technology, Equipment, and Systems. Delmar Publishing.
- ✓ Walker, J. R. (2004). Machining Fundamentals. (8th Edition). Goodheart-Willcox Co.
- ✓ Woodruff, E., Lammers, H., & Lammers, T. (2004). Steam Plant Operation. (8th Edition). McGraw-Hill Publishing.

Emergency and Standard Operating Procedures (4 items)

Understanding of procedures established for normal operation, maintenance guidelines, and recommended corrective action that is to be utilized by the Operator Mechanic in emergency situations. These procedures are set forth in standard station orders, operation and maintenance instructions, and System Operating Bulletins. Includes knowledge of combined cycle power plant operation and maintenance procedures.

- ✓ Cal OSHA- CCR: Title 8, Section 3314
- ✓ Kehlhofer, R., Hannemann, F., et al. (2009). Combined-Cycles Gas and Steam Turbine Power Plants. PennWell.

Safety and Clearance Procedures (18 items)

Understanding of First aid, firefighting, and accident prevention programs, methods, and techniques involved in switching, clearing equipment, and operating primary and auxiliary components. Knowledge of procedures required for using tools and equipment safely and all safe work practices as they relate to operating and maintaining a power generating station. Knowledge of environmental rules and regulations and their application to power plant operation and maintenance.

- ✓ Cal OSHA- Title 8, Section 3314
- ✓ Cal OSHA: Title 8, Section 5002
- ✓ Cal OSHA: Title 8, Section 5194
- ✓ Cal OSHA: Title 8, Section 6150
- ✓ Cal OSHA: Title 8: 6980 (f) 15-4
- ✓ Federal OSHA: 1910: Fire Protection
- ✓ Federal OSHA: 1910.1200
- ✓ Federal OSHA: 1910.146
- ✓ Federal OSHA: 1910.147
- ✓ Kemp, A. W. (2008). Industrial Mechanics. (2nd Edition). ATP publications.
- ✓ Walker, J. R. (2004). Machining Fundamentals. (8th Edition). Goodheart-Willcox Co.

SOUTHERN CALIFORNIA EDISON®
Energy for What's Ahead®

SAMPLE QUESTIONS

The following sample questions should give you some idea of the form the test will take.

1. For the following statement, which response is not true? "Boiler tube scaling, caused by hard water, can result in _____"
   a) overheating of the tubes
   b) excessive tube hum
   c) loss of heat-transfer surface
   d) failure of the boiler tube

2. What is the most critical valve on a boiler?
   a) Blowoff valve
   b) Nonreturn valve
   c) Safety valve
   d) Peristaltic valve

3. What is the main purpose of using a torque wrench?

   a) To measure force
   b) To apply a specific torque to a fastener
   c) To measure rotational speed
   d) d. To tighten fasteners with high precision

4. In a centrifugal pump, cavitation can be prevented by:

   a) Increasing the pump speed
   b) Decreasing the pump speed
   c) Increasing the suction head
   d) Decreasing the suction head

Sample Question Answers

1. B
2. C
3. B
4. C

STUDY GUIDE FEEDBACK

Please email to notify us of any changes in policies, procedures, or materials affecting this guide.

Southern California Edison, Corporate Testing

EdisonTesting@sce.com