Guide

To Taking The Written Test For

WATER & WASTEWATER TREATMENT PLANT OPERATOR/TRAINEE SERIES

New York State Department of Civil Service

Albany, New York

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INTRODUCTION

The New York State Department of Civil Service has developed this Guide to familiarize you with the Water and Wastewater Treatment Plant Operator/Trainee Series written test. It provides a general description of the subject areas to be tested and the different types of questions you will likely see on the test. The Examination Announcement will specify the exact subject areas to be included on the test you will be taking.

The Water and Wastewater Treatment Plant Operator/Trainee Series written test has an overall time allowance of 3 hours. The test is divided into six separate subject areas and the questions are designed to evaluate knowledge and abilities in the following areas:

1. **MECHANICAL APTITUDE:** These questions test your ability to identify and understand how basic mechanical instruments such as motors and gears work.

2. **SAFETY PRACTICES:** These questions test your knowledge of basic safety practices.

3. **TOOLS AND READING OF SCALES AND GAUGES:** These questions test your ability to recognize or identify basic tools and their common uses and to make accurate readings of various types of dials, scales and gauges.

4. **ELEMENTARY CHEMISTRY AND GENERAL SCIENCE:** These questions test your knowledge of basic processes and concepts in chemistry and general science.

5. **UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL:** These questions test how well you comprehend written material.

6. **BASIC MATHEMATICS:** These questions test your ability to use addition, subtraction, multiplication and division to solve basic arithmetic problems that might be encountered in water and wastewater treatment plant operations. Questions may also involve the use of fractions, decimals, averages, and percents.

These are the only subject areas that will be included on the written test.

The remainder of this guide explains how you are tested in each of these subject areas. A **TEST TASK** is provided for each subject. This is an explanation of how a question is presented and how to correctly answer it. Be sure to read each one carefully.

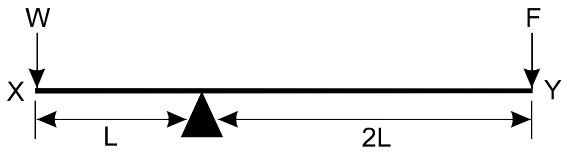
You will also be given at least one **SAMPLE QUESTION** for each subject area. It will be of the type that you will see on the actual test. The **SOLUTION** and correct answer are provided after each question. You should study the question and its solution until you understand how it works.

SUBJECT AREA 1

MECHANICAL APTITUDE: These questions test your ability to identify and understand how basic mechanical instruments such as motors and gears work.

TEST TASK: You will be given questions accompanied by diagrams of mechanical devices. You will be required to demonstrate an understanding of how the devices work.

SAMPLE QUESTION:



In the balance, or scale, system shown above, how much force (F) must be applied at point Y to balance the weight (W) at point X?

A. F = ½ W
B. F = W
C. F = 2 W
D. F = 3 W

Answer is A.

SOLUTION: *To solve this question you must be able to recognize the point at which force (F) is applied is twice as far from the fulcrum (balance point) as weight (W) and therefore force (F) needs to be only ½ as much as weight (W) to keep the system in balance. Therefore the correct answer is A.*

SUBJECT AREA 2

SAFETY PRACTICES: These questions test your knowledge of basic safety practices.

TEST TASK: You will be required to demonstrate your knowledge of basic safety practices.

SAMPLE QUESTION:

Of the following information concerning an accident which resulted in an injury, the most valuable information for use in taking preventive measures is the

A. time of the accident
B. cause of the accident
C. medical cost
D. nature of the injury

Answer is B.

SOLUTION: *To answer this question you must be able to recognize that to prevent future accidents from occurring it is necessary to know how and why such accidents have occurred in the past. This knowledge of the cause of past accidents will help to get to the root of the problem and prevent similar type accidents in the future. Choices A, C and D do not get to the root of the problem. Therefore the correct answer is B.*

SUBJECT AREA 3

TOOLS AND READING OF SCALES AND GAUGES: These questions test your ability to recognize or identify basic tools and their common uses and to make accurate readings of various types of dials, scales and gauges.

TEST TASK: You will be given questions about basic tools and you will be asked to identify them or identify what they are used for. You will also be given questions that will test your ability to make accurate readings of dials, scales, and gauges.

SAMPLE QUESTIONS:

Question 1

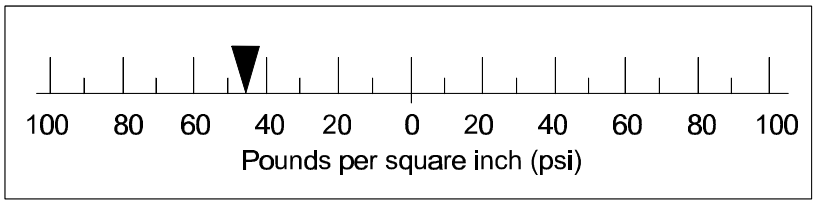
Which one of the following types of saw is best used for cutting metal?

A. rip saw
B. cross-cut saw
C. hacksaw
D. coping saw

Answer is C.

SOLUTION: *To answer this question you must know enough about basic tools to know that a hacksaw is specifically used for cutting metal, and choices A, B and D are all wood-cutting saws. Therefore the correct answer is C.*

Question 2



Which one of the following is most nearly the reading on the above pressure gauge?

A. 50 psi
B. 45 psi
C. -45 psi
D. -50 psi

Answer is C.

SOLUTION: *To solve this question you must (1) recognize that by convention the numbers to the right of -0- on the pounds per square inch (psi) scale are positive (+) and the numbers to the left of -0- on the scale are negative (-), then (2) determine that the hash mark between –40 and –60 is –50, then (3) determine that the reading indicated by the arrow is half way between –40 and –50. Therefore the correct answer is C.*

SUBJECT AREA 4

ELEMENTARY CHEMISTRY AND GENERAL SCIENCE: These questions test your knowledge of basic processes and concepts in chemistry and general science.

TEST TASK: In this subject area you will be required to display knowledge of basic facts and principles of elementary chemistry and general science.

SAMPLE QUESTIONS:

Question 1

The element chlorine, used to disinfect water, has which one of the following chemical symbols?

A. Ch
B. Cl
C. Co
D. Cr

Answer is B.

SOLUTION: *To answer this question you must have enough general chemistry knowledge to know that the chemical symbol for chlorine is Cl. Ch is not a chemical symbol, Co is the chemical symbol for cobalt, and Cr is the chemical symbol for chromium. Therefore the correct answer is B.*

Question 2

Under standard conditions, one cubic centimeter (cc) of water has a mass of which one of the following?

A. one ounce
B. one slug
C. one gram
D. one pound

Answer is C.

SOLUTION: *To solve this question you must know that one cubic centimeter of water has a mass of one gram. This is a standard principle of general science. Therefore the correct answer is C.*

SUBJECT AREA 5

UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL: These questions test how well you comprehend written material.

TEST TASK: You will be provided with brief reading selections, followed by a set of alternative statements relating to each selection. You must indicate the most appropriate statement relating to the selection on the basis of whether it: 1) accurately paraphrases portions of the selection; or 2) adequately summarizes the selection; or 3) presents an inference that can reasonably be drawn from the selection.

SAMPLE QUESTION:

"The major cause of injuries is slips and falls. Tools, parts and other things should not be left lying around. Grease droppings, oils, sludge, and especially polymers should be cleaned up as soon as possible. Warning signs, railings and covers can protect against low piping, open tanks and open manholes or hatches. The simple knowledge of proper lifting techniques, such as bending the knees and lifting with muscles of the legs, can save many strained or injured backs."

QUESTION: According to the above paragraph, which one of the following is the primary cause of injury?

A. improper lifting techniques
B. grease or polymer burns
C. slips and falls
D. low piping

Answer is C.

SOLUTION: *To answer this question, evaluate all the choices.*

Choice A lists improper lifting techniques as the primary cause of injury. The paragraphs states only that the simple knowledge of lifting techniques, bending the knees and lifting with muscles of the legs can save many strained or injured backs. Therefore this choice is incorrect.

Choice B lists grease or polymer burns as the primary cause of injury. The paragraph states only that grease droppings, oils, sludge and especially polymers should be cleaned up as soon as possible. Therefore this choice is incorrect.

Choice C lists slips and falls as the primary cause of injury. The paragraph states: "The major cause of injuries is slips and falls". This choice is correct.

Choice D lists low piping as the primary cause of injury. The paragraph states only that warning signs, railings and covers can protect against low piping, open tanks and open manholes or hatches. Therefore this choice is incorrect.

SUBJECT AREA 6

BASIC MATHEMATICS: These questions test your ability to use addition, subtraction, multiplication and division to solve basic arithmetic problems that might be encountered in water and wastewater treatment plant operations. Questions may also involve the use of fractions, decimals, averages, and percents.

TEST TASK: You will be required to use addition, subtraction, multiplication and division to solve basic mathematical problems typical of those found on the job in this title.

SAMPLE QUESTION:

If 200 yards of cable costs $360.00, what will thirty feet of the same cable cost?

A. $15.00
B. $18.00
C. $45.00
D. $54.00

Answer is B.

SOLUTION:

To solve this question you must divide $360.00 by 200 yards to find that the cable costs $1.80 per yard. Since there are 3 feet per yard, the cable therefore costs $\frac{\$1.80}{3}$ *or $.60 per foot. So thirty feet of cable costs: 30 feet X $.60 per foot, or $18.00. Therefore the correct answer is B.*

CONCLUSION

You and your feelings about tests have a great deal to do with how you perform on a test. Some people get so tense and nervous that they don't do as well as they could. They forget things they know or make simple mistakes. The following suggestions should help you overcome these problems.

- Study and review this Guide to become familiar with the test contents.
- Give yourself plenty of time to do what you need to do before the test starts. Arrive at the test room a little ahead of the starting time.
- Try to relax just before the test starts.
- Listen carefully to the instructions the Monitors give you. Carefully read all instructions on the Candidate Directions you are given at the test as well as information on the covers of the test booklets.
- Try to keep calm, cool and collected throughout the test.
- Keep track of time.