New York State
Department of Civil Service

Committed to Innovation, Quality, and Excellence

A Guide to the Written Test

for the

Water & Wastewater Treatment Plant Operator / Trainee Series

Opportunities at work.

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Governor

INTRODUCTION

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

The written test for the Water and Wastewater Treatment Plant Operator / Trainee Series has an overall time allowance of 3 hours. The test questions will cover the following six subject areas:

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

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

3. **TOOLS AND READING OF SCALES AND GAUGES:** These questions test for the ability to recognize or identify basic tools and their common uses, and for the ability to accurately read various types of dials, scales, and gauges.

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

5. **UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL:** These questions test for the ability to read, understand, and interpret written material.

6. **BASIC MATHEMATICS:** These questions test for the 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.

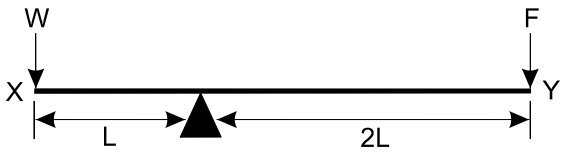
The remainder of this test guide explains how you will be tested in each of the subject areas listed above. A **TEST TASK** is provided for each subject area. This is an explanation of how a question will be presented and how to correctly answer it. Read each explanation carefully. This test guide also provides at least one **SAMPLE QUESTION** for each subject area. The sample question is similar to the type of questions that will be presented on the actual test. This test guide provides the **SOLUTION** and correct answer to each sample question. You should study each sample question and solution in order to understand how the correct answer was determined.

SUBJECT AREA 1

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

TEST TASK: You will be presented with diagrams of mechanical devices, along with questions which require you to demonstrate an understanding of how the mechanical 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

SOLUTION: *To answer this question correctly, you must recognize that the point at which force (F) is applied, is twice as far from the fulcrum (balance point) as is the weight (W); therefore, force (F) need be only ½ as much as weight (W) in order to keep the system in balance. This can be represented as F = ½ W (choice A).*

The correct answer to this sample question is A.

SUBJECT AREA 2

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

TEST TASK: The questions will require you to demonstrate your knowledge of basic safety practices.

SAMPLE QUESTION:

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

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

SOLUTION: *To answer this question correctly, you must recognize that, in order to prevent future accidents from occurring, you must know how and why such accidents occurred in the past. Knowledge of the cause of the accident (choice B) will help you to prevent similar accidents from occurring in the future. Therefore, the correct answer to this sample question is B.*

The correct answer to this sample question is B.

SUBJECT AREA 3

TOOLS AND READING OF SCALES AND GAUGES: These questions test for the ability to recognize or identify basic tools and their common uses, and for the ability to accurately read various types of dials, scales, and gauges.

TEST TASK: Some questions will ask you to identify basic tools or what the tools are used for. Other questions will test your ability to accurately read various types of dials, scales, and gauges.

SAMPLE QUESTION 1:

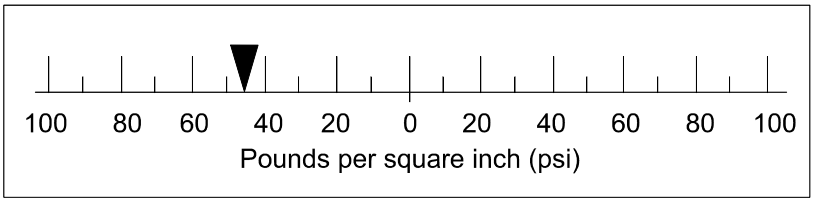
Which one of the following types of saw is best used for cutting metal?

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

SOLUTION: *To answer this question correctly, you must know that a hacksaw (choice C) is specifically used for cutting metal. Choices A, B, and D are all used for cutting wood.*

The correct answer to sample question 1 is C.

SAMPLE QUESTION 2:



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

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

SOLUTION: *To answer this question correctly,*

- *You must first know that, by convention, numbers to the right of the zero (0) point on the pounds per square inch (psi) scale are positive (+), and numbers to the left of the zero (0) point are negative (-).*
- *Then, you must be able to identify that the hash mark on the scale between -40 and -60 is -50.*
- *Then, you must be able to read that the arrow on the scale is half way between -40 and -50.*
- *Finally, you must be able to identify that the reading half way between -40 and -50 is -45.*
- *Therefore, the reading shown on the pressure gauge above is most nearly -45 psi (choice C).*

The correct answer to sample question 2 is C.

SUBJECT AREA 4

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

TEST TASK: You will be required to display knowledge of basic concepts, facts, principles, and processes of elementary chemistry and general science.

SAMPLE 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

SOLUTION: *To answer this question correctly, you must know that the chemical symbol for chlorine is Cl (choice B). Ch is not a chemical symbol; Co is the chemical symbol for cobalt; Cr is the chemical symbol for chromium.*

The correct answer to sample question 1 is B.

SAMPLE 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

SOLUTION: *To answer this question correctly, you must know that, under standard conditions, one cubic centimeter (cc) of water has a mass of one gram (choice C).*

The correct answer to sample question 2 is C.

SUBJECT AREA 5

UNDERSTANDING AND INTERPRETING WRITTEN MATERIAL: These questions test for the ability to read, understand, and interpret written material.

TEST TASK: For each question, you will be provided with a brief section of written material, followed by a question and a set of alternative statements relating to the written material. You must choose the statement that best answers the question. Base your answer on whether the statement 1) accurately paraphrases portions of the written material; or 2) adequately summarizes the written material; or 3) presents an inference that can reasonably be drawn from the written material.

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."

According to the paragraph above, 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

SOLUTION*:* *To answer this question correctly, you must evaluate each choice:*

Choice A *lists "improper lifting techniques" as the primary cause of injury. The paragraph above states only that "the simple knowledge of lifting techniques, such as bending the knees and lifting with muscles of the legs, can save many strained or injured backs." The paragraph does not state that improper lifting techniques are the primary cause of injury. Therefore, choice A is not the correct answer to this question.*

Choice B *lists "grease or polymer burns" as the primary cause of injury. The paragraph above states only that "grease droppings, oils, sludge, and especially polymers should be cleaned up as soon as possible." The paragraph does not state that grease or polymer burns are the primary cause of injury. Therefore, choice B is not the correct answer to this question.*

Choice C *lists "slips and falls" as the primary cause of injury. The paragraph above states that "The major cause of injuries is slips and falls." Therefore, choice C is the correct answer to this question.*

Choice D *lists "low piping" as the primary cause of injury. The paragraph above states only that "warning signs, railings, and covers can protect against low piping, open tanks, and open manholes or hatches." The paragraph does not state that low piping is the primary cause of injury. Therefore, choice D is not the correct answer to this question.*

The correct answer to this sample question is C.

SUBJECT AREA 6

BASIC MATHEMATICS: These questions test for the 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

SOLUTION: *To answer this question correctly:*

- *First determine how much <u>one yard</u> of cable costs:*
  ($360.00 divided by 200 yards = $1.80 per yard.)

- *Then, determine how much <u>one foot</u> of cable costs:*
  ($1.80 per yard divided by 3 feet per yard = $0.60 per foot.)

- *Finally, determine how much <u>30 feet</u> of cable costs:*
  ($0.60 per foot multiplied by 30 feet = $18.00.)

The correct answer to this sample question is B.

TEST SECURITY

The test you will be taking is the property of the New York State Department of Civil Service. Candidates may not remove test material from the test site and may not reproduce, reconstruct, or discuss the test content with others. Unauthorized possession or disclosure of the test material is prohibited by law and punishable by imprisonment and/or a fine. Additionally, candidates may be disqualified from appointment to the positions for which the examination is being held and from being a candidate for any civil service examination for five years. After you take the test, other individuals may want to talk with you about the test. You should not discuss the questions and answers, even in general terms. You should be careful that you do not inadvertently violate test security and put yourself at risk.

CONCLUSION

Your attitude and approach to the test will influence how well you perform. A positive attitude will help you do your best.

Before the test ...

- Study and review this guide to familiarize yourself with what the test will cover.
- Study and review the subject areas to be covered on the test.

On the day of the test ...

- Arrive at the test site on time.
- Bring your Admission Notice, two No. 2 pencils, a photo ID containing your signature, a quiet lunch or snack, and any other **allowed** materials.
- Do **NOT** bring this test guide to the test site.

At the test site …

- Do **NOT** bring cell phones, beepers, headphones, or any electronic or other communication devices to the test site.
- The use of such devices anywhere on the grounds of the test site (this includes the test room, hallways, restrooms, building, grounds, and parking lots) could result in your disqualification.

During the test ...

- Read and follow all directions on your Admission Notice, test booklets, answer sheets, and Candidate Directions.
- Follow the Monitor's instructions.
- Keep track of the time.

After the test ...

- Do **NOT** remove any test materials from the test room.
- Do **NOT** paraphrase, reconstruct, or reproduce the test material in any way.
- Do **NOT** discuss the test material with others.

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