



DEPARTMENT OF HUMAN RESOURCES

Study Guide Traffic Signal Technician Series Written Examination

- The Traffic Signal Technician Series exam is required for the Traffic Signal Technician I and Traffic Signal Technician II classifications.
- This booklet contains SAMPLE QUESTIONS ONLY. Studying this booklet will not necessarily improve your exam score.

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PURPOSE AND CONTENT OF THIS STUDY GUIDE

This guide was developed to help you prepare to take the written exam for Traffic Signal Technician I and II. It contains general exam-taking advice and also provides specific information related to the exam content. This information includes the subject areas covered by the exam, the kinds of questions to expect, strategies for approaching the questions, and sample questions. Though this information cannot guarantee a higher exam score, it can give you direction for your exam preparation that will assist you in doing your best.

PREPARING TO TAKE THE EXAM

Before the Day of the Exam

- Review this guide to get familiar with the content of the exam. Knowing about the topics and kinds of questions that will be in the exam will ensure that you will not be surprised by the content of the exam or the manner in which it is presented. This can improve your ability to demonstrate your job potential.
- Make sure that you know where the exam will be administered and all of the relevant details, such as where to park, where to report for the exam, and what identification is required.

On the Day of the Exam

- Make sure that you are well rested and have eaten. These things will help your concentration during the exam.
- Plan your day to allow plenty of time to get yourself prepared and get to the exam site. Allow enough time to cope with weather, traffic, parking, etc. Hurrying creates anxiety, so do not put yourself in the position of having to hurry.
- Listen carefully to all instructions from the exam administrator. Make sure that you understand the instructions and carry them out correctly. Ask questions at the proper time before the exam begins if you are unsure of any aspect of what you should do during the exam.

GENERAL EXAM TAKING TIPS

- Use your time carefully. The time limit should provide you with more than enough time if you move through the exam steadily and do not spend too much time on any one question.
- Read the questions and answer choices carefully. Read all of the answer choices before you select an answer.
- If you come to a question that is especially difficult, skip that question and come back to it later if you have time.
- Answer every question. Scores are based on the number of correct answers. You will receive no credit if you leave an answer space blank. It is to your advantage to use your best judgment to make a choice among the answer choices provided.

TRAFFIC SIGNAL TECHNICIAN SERIES WRITTEN EXAM

This written exam is based upon a job study that identified the most important knowledge, skills, and abilities required to perform the job successfully. These areas include:

- your knowledge of electrical concepts.
- your skill in interpreting electrical diagrams and symbols and performing basic electrical problem solving.
- your knowledge of safety practices related to working with electricity.

All of the exam questions are presented in a multiple-choice format. Each question is identified by a question number that is followed by a question statement. After the question statement, there are between two and four answer choices. You should read all of the answer choices and then choose the best answer. **Each question has only one correct answer.**

EXAM SECTION 1: ELECTRICAL CONCEPTS

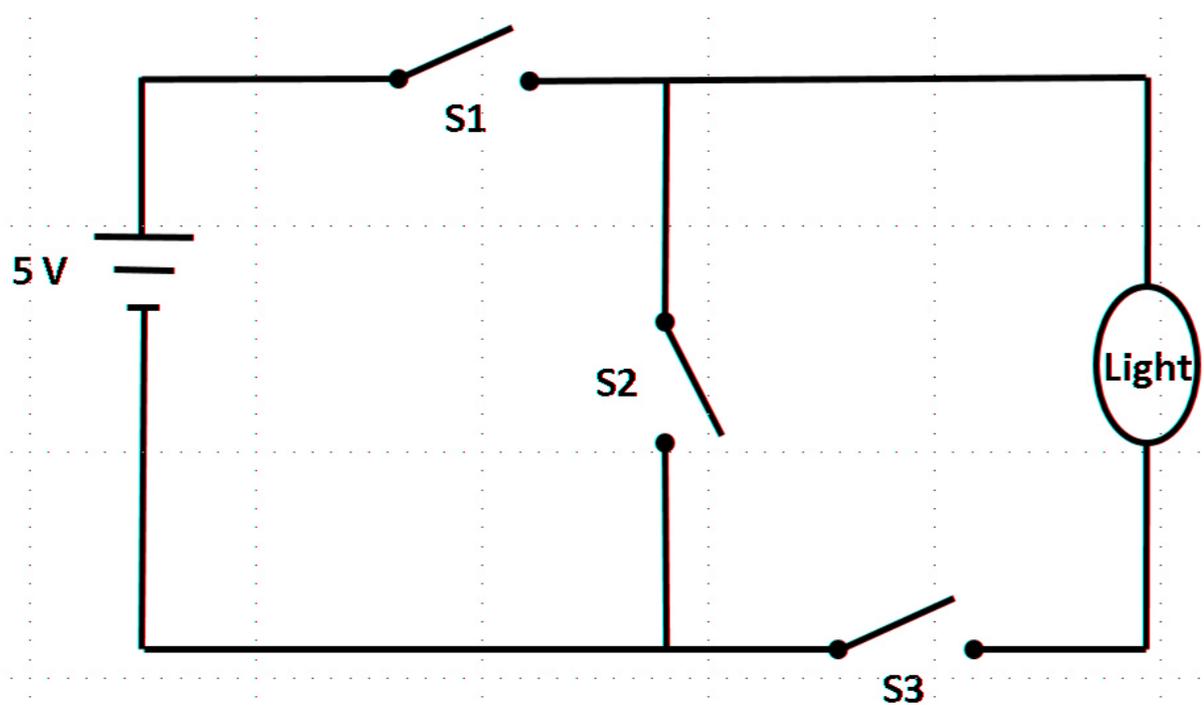
This exam section contains twenty-eight (28) questions designed to assess your knowledge of electrical concepts. Question content includes electrical components, equipment, units of measurement, and the flow of current. A good strategy for answering questions in this section is to prepare before the exam by reviewing the areas described above. Then, when taking the exam, identify the concept addressed by the question such as paths of current or power, resistance, conductivity, etc. When you have clarified the concept, you should be better able to draw upon your knowledge base and thoughtfully consider the response choices.

Examples of these types of questions are shown below. Each question is followed by a brief explanation of the correct answer.

1. Which of the following is the base unit of electric current in the International System of Units used to indicate the quantity of electric current?
 - A. Volt.
 - B. Ohm.
 - C. Watt.
 - D. Ampere.

Answer: The correct answer to sample question #1 is response choice “D”. The ampere is the base unit of electric current in the International System of Units. A volt is the difference in electric potential between two points. A watt is a unit of power that quantifies the rate of energy transfer. An ohm is the standard unit of electrical resistance.

2. In the circuit shown below, which switch or switches need to be closed to turn on the light?
 - A. S1 only.
 - B. S1 and S2.
 - C. S3 only.
 - D. S1 and S3.



Answer: The correct answer to sample question #2 is response choice “D”. In order for current to flow and turn on the light, there must be a continuous connection from the battery to the light and then back to the battery. Therefore, switches S1 and S3 must be closed to complete that connectivity. S2 being open has no impact on the functioning of the light.

3. Two or more elements in an electric circuit are in parallel when they:

- A. form a loop.
- B. have the same current.
- C. are connected sequentially.
- D. are connected to the same two nodes.

Answer: The correct answer to sample question #3 is response choice “D”. Two or more elements in a circuit are parallel if they are connected to the same two nodes. Elements that are connected sequentially, and thus, have the same current are defined as series. A loop is a closed path in a circuit.

EXAM SECTION 2: ELECTRICAL DIAGRAMS AND PROBLEM SOLVING

This exam section contains twenty-eight (28) questions that evaluate your skill in interpreting electrical diagrams and symbols and performing basic electrical problem solving. Questions include identification of electrical symbols, interpreting basic circuit diagrams, and determining outcomes in specific circumstances. A good strategy to prepare for this exam section is to review electrical symbols and practice calculating outcomes such as resistance, voltage, and power usage in basic circuits.

Examples of the types of questions in this exam section are shown below. Each question is followed by an explanation of the correct answer.

4. The symbol shown below is used in electrical diagrams to represent:

- A. a fuse.
- B. a capacitor.
- C. an inductor.
- D. a circuit breaker.



Answer: The correct answer to sample question #4 is response choice “D”. Schematic diagrams provide a picture of electrical circuits that are often easier to interpret than descriptions using words. These diagrams use basic electrical symbols to identify components. A circuit breaker is an automatically operated electrical switch that is depicted on electrical schematic diagrams by the symbol shown above.

5. A motor uses 120 volts and draws 4 amperes. What is the internal resistance of the motor?

- A. 30 ohms.
- B. 60 ohms.
- C. 100 ohms.
- D. 120 ohms.

Answer: The correct answer to sample question #5 is response choice “A”. To determine the resistance of the motor, you must apply Ohm's Law (Voltage = Current x Resistance). In this case, voltage and current are known so the equation must be reconfigured to solve for the unknown variable, resistance. Therefore, the correct calculation is: Resistance = Voltage/current ($R=120/4$), which results in the

correct answer of 30 ohms.

6. A circuit contains two sealed lead acid batteries connected in series that are rated at 3 volts each. Given this configuration, the output voltage of the circuit is:
- A. 3 V.
 - B. 6 V.
 - C. 9 V.
 - D. 12 V.

Answer: The correct answer to sample question #6 is response choice “B”. In a series circuit, the voltage across the circuit is the sum of the battery voltages. In a parallel circuit, the voltage across each of the components remains constant.

EXAM SECTION 3: ELECTRICAL SAFETY

This exam section contains twenty-eight (28) questions that assess your knowledge of safety practices related to working with electricity. Question content addresses basic safety practices, recognition of hazards, and responding to accidents. A good strategy to use in preparing for this exam section is to locate resource materials that describe electrical safety practices geared towards those who work with electricity. These can be readily located in textbooks or online resources. When answering the questions, consider the nature of the hazard presented and the best method for minimizing it. Try to visualize the situation and then consider the impact of each response choice.

Examples of the types of questions in this exam section are shown below. Each question is followed by a brief explanation of the correct answer.

7. Which of the following is a recommended safety precaution when working on electrical equipment, such as a breaker, that is housed in a cubicle or box with a door?
- A. Stand to the open side of the cubicle door.
 - B. Stand to the hinged side of the cubicle door.

- C. Stand as far away from the door as possible.
- D. Fasten the cubicle door to something that will hold it open.

Answer: The correct answer to sample question #7 is response choice “B” For this question it is important to consider the potential hazard in working with equipment encased within a structure that has a door. Given that the choices involve positioning, the most likely type of hazard involves electrical arc blasts. In such a situation, standing to the hinged side of the door while working will provide the greatest protection in the event of such an occurrence.

8. Which of the following is most important to do before attempting to assist in a situation involving an electrical accident injury?
- A. Put on non-flammable clothing.
 - B. Take slow steps towards the victim.
 - C. Make sure that your hands and feet are dry.
 - D. Place feet widely apart before touching the victim.

Answer: The correct answer to sample question #8 is response choice “C”. For this question, one should consider the nature of the hazard when someone has experienced an electrical shock. The greatest risk to a responder is a transfer of electrical current from the victim or immediate environment. Therefore, it is important that hands and feet are dry because the human resistance to electrical current is significantly lower when skin is wet.

9. Which of the following is the best way to stay hydrated when you are working outdoors in hot and humid conditions?
- A. Consume only beverages that are very cold.
 - B. Frequently consume small amounts of water.
 - C. Consume any kind of drink that has sugar in it.
 - D. On scheduled breaks, consume as much water as you can.

Answer: The correct answer to sample question #9 is response option "B". The safest way to stay hydrated is to frequently consume small amounts of water.

ADDITIONAL ASSISTANCE

If you feel that you would benefit from more practice, your local library or relevant

internet web sites may have reference materials that can be helpful. This is true for all of the subject areas covered by the Traffic Signal Technician I & II written exam.