Irrigation

Test Book

Note to Spanish speaking candidates: The test book, written exams and study manuals are provided in Spanish; however any plans or diagrams used as part of the test are in English only. Please be aware that you will need to be able to work with these documents to successfully complete the exam.

Nota a los candidatos hispanoparlantes: El libro del examen, los exámenes escritos y los manuales de estudio serán entregados en español; sin embargo, los planos o diagramas utilizados como parte del examen, están en el idioma inglés solamente. Sirvase tomar nota de que tendrá que estar en capacidad de entender y trabajar con estos documentos para poder completar el examen de manera exitosa.
# Landscape Industry Certified Technician

## Irrigation TEST BOOK

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Candidates for the Landscape Industry Certified Technician (formerly CLT) designation are urged to prepare for the exam rather than merely rely on their experience. One excellent preparation method is to study the **Landscape Training Manual for Installation Technicians**, the **Landscape Training Manual for Irrigation Technicians** or the **Landscape Training Manual for Maintenance Technicians** published by Professional Landcare Network (PLANET). Study references are provided on each test book page.

The manual is available online at [www.landscapeindustrycertified.org](http://www.landscapeindustrycertified.org)

To order by phone call PLANET at 800.395.2522 in the US or CNLA at 888.446.3499 in Canada. The state or regional association offering this test may also have this manual available for purchase.
EXTERIOR TEST SAFETY STATEMENT

The safe use of tools and equipment includes but is not limited to the usage of any tool or equipment in a manner that keeps all persons free from any harm or risk to health and welfare and all property free from unintended damage. Safe usage of tools and equipment shall ensure that no harm, threat, or danger to people or property is experienced or perceived by any observer of the operator.

Safe use of tools and equipment shall include:

- the understanding and following of all items as stated in the appropriate manufacturers’ operators manuals or catalogues
- state and federal regulations, and trade practices including using the tools or equipment for their intended purpose and
- adhering to all personal protective equipment and safety requirements.

Safe use of tools includes but is not limited to good housekeeping practices such as:

- maintaining a tidy and orderly worksite
- having waste and debris in appropriate collection
- storing hand tools properly whether in use or not, (i.e. rakes placed with tines down, shovels placed with blades down, pruners sheathed or locked when not being safely used, etc.)
- maintaining clear pedestrian paths with tools stored in such a manner as not to cause potential trip hazards or other unforeseen dangers.

Safe use of equipment includes but is not limited to the following practices:

- only operating equipment that has been thoroughly inspected by operator and in operator’s best judgment is deemed serviceable for its intended use,
- never leaving a running piece of equipment unattended
- fueling only when engine is cool and not running
- maintaining a clean work area free of debris and litter
- starting equipment in the manufacturer’s recommended state (such as clutches engaged or disengaged, transmissions in neutral, power take-offs disengaged, etc.)
- staying alert for problems with the surrounding terrain
- being aware of all pedestrian activity around the operating area
- shutting-off and parking or storing equipment per manufacturer’s recommendations.

Note: In all cases throughout Landscape Industry Certified Technician tests, where a manufacturer’s manual states an item is “recommended” it shall be interpreted to mean, “required”. 
Problem 1.01 – Common Core (Written Test)

Time Allowed: 60 minutes

Study Reference: See the following Landscape Training Manuals for Technicians

Note: The information found in the supplemental attached pages shall be considered correct in cases where there are discrepancies with the information in the Training Manuals.

<table>
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<tr>
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<th>Installation</th>
<th>Maintenance</th>
<th>Irrigation</th>
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<td>Chapter 9</td>
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<tr>
<td>Basic math</td>
<td>Chapter 2</td>
<td>Chapter 2</td>
<td>Chapter 3</td>
</tr>
</tbody>
</table>

Procedure: Score Weighting 100

This written test will be handed out and completed in the classroom.

You will be required to answer questions on the following:

1. Communication
2. Job reporting
3. Safety and first aid
4. Vehicle operation and safety
5. Production rates
6. Basic math

Technical component 35
Safety component 65
Maximum score 100
First Aid and Safety (supplemental information)

This information is provided not only to help you pass the portion of the Common Core test that includes first aid and safety, but also to help you if an emergency happens on the job or in your private life. In your position in the landscape industry, it is important for you to know how to act and respond in all situations. Please do not limit yourself. There are excellent CPR programs and First Responder courses offered by the Red Cross and other organizations. This knowledge could make a difference in saving someone’s life.

Often patients need immediate care before EMT (Emergency Medical Technicians) can reach the scene. Usually, the first person to reach the patient is not trained in emergency care. In most localities, too few individuals are trained in first aid and basic life support. The Red Cross and other associations have successfully trained many people, but not enough citizens have taken advantage of these training programs. Those trained in basic first aid and life support have saved lives by providing care before the Emergency Medical Service (EMS) arrived. The problem is that there are not enough people who can provide the care that is needed.

This study information does not qualify you to perform first aid. It only shows how important it is to become trained in First Aid and CPR, in the event that you witness an emergency and are the only person who can help.

*NOTE:* This information is not all-inclusive for questions asked in this test. There are additional “common sense” questions, beyond what information is given.

**First Reaction:** In any emergency situation, the very first thing you should do is get help. In most communities, calling 9-1-1 can activate Emergency Medical Services (EMS).

**Electricity:** Whenever working with electricity, make sure the electricity is turned off at the source. If an electric line is down, call the electric company and have them turn the power off. Do not do anything until the power is disconnected.

**Burns:** There are three degrees of burns.
- **1st degree burns** are the least severe and involve the outer layer of skin only, i.e. sunburn.
- **2nd degree burns** have red or mottled skin, blisters, wet skin surface, is painful, and involves the outer layer of the skin and the dermis.
- **3rd degree burns** are the most severe burns. The burned skin includes charred epidermis, dermis, fat and muscle tissue, skin coagulation, loss of skin, and scar tissue forms. There is no pain in the 3rd degree burn because nerve endings are destroyed.

**Care for 1st and 2nd degree burns:** Cool compresses can be placed on the burn for pain relief; cool water immersion for 2 - 5 minutes, as long as the burn is not over 10% of the body.

**Care of 3rd degree burns:** Cover with a sterile, dry dressing. Do not apply anything other than water to a burn. Watch for shock. Do not allow the patient to have anything by mouth and keep them lying down.

**Bleeding:** The order of care when trying to control profuse bleeding is: direct pressure, elevation, pressure points, and as a very last resort, tourniquet.

**Frostbite:** The sign or symptom of frostbite is when the skin becomes gray or blotchy white.
Chemicals: If someone gets an unknown chemical in his/her eye, flush the eye with a gentle stream of cool, running water or with eyewash solution for 20 minutes. Always contact Emergency Services, a hospital, or poison center if pain is persistent. Most chemicals that get on bare skin can be rinsed with copious amounts of water. One exception is dry lime. This chemical should be brushed away, before washing the area with water for at least 20 minutes.

If possible, identify the chemical involved. Always read the label before using any chemical. The Material Safety Data Sheet (MSDS) for the chemical contains the emergency and first aid procedures specific to that chemical. The MSDS also provides personal protection information, health information, special precautions, composition, physical data, etc.

Allergies: Signs and symptoms of an allergy: if a person’s face becomes swollen and blotchy (hives), their respiration is labored and wheezing, and they become faint. If you see these symptoms, get help. This is a true emergency and can be fatal, if not treated by professionals.

Impaled Objects: An impaled object in the globe of an eye should be left in place. Cover the good eye to help slow eye movement. Pad around the object loosely, then place a cup or cone over the object and secure in place. If there is an object impaled in the cheek and its point has broken through the cheek wall into the mouth, the object should be removed.

A gauze pack should be placed between the teeth and cheek wall and another on the outside of the cheek. The reason this object is removed is to prevent choking. A piece of the object could be broken and swallowed. This is the only time an impaled object is removed. Impaled objects anywhere else on the body should be left in place and secured with padding.

Amputation: Amputated limbs should be wrapped in sterile gauze or clean cloth, if possible, then placed in a watertight plastic bag. The bag should then be put on ice.

Heat Cramps: A person who has heat cramps will have painful muscle spasms in his/her legs, arms, or abdomen. To treat heat cramps, move the person to a shaded area, loosen his/her clothing, and give the person cool fluids to drink.

Heat Exhaustion: Heat exhaustion patients will have signs and symptoms of feeling weak and dizzy, their breathing will be rapid and very shallow, they will be perspiring heavily, but the skin will be pale and clammy. To treat heat exhaustion, move the person to a shaded area and have him/her rest lying down; call 911 for professional emergency help; loosen or remove the person’s clothing and splash cold water on his/her body; if conscious, give the person frequent, small amounts of water to drink.

Heat Stroke: When a person has a heat stroke, he/she will have an extremely high body temperature; slowed down or no sweating; rapid breathing and pulse, if conscious; and will exhibit confusion and irrational behavior. The person may also have convulsions or enter into a coma. This is a life-threatening medical emergency; immediately call 911. While waiting for EMS to arrive, move the person to a shaded area and remove his/her outer clothing; cover the person with thin, wet towels if available; then pour on water and fan vigorously. If the person is conscious, give him/her frequent, small amounts of water to drink.

Nosebleed: The best way to take care of a simple nosebleed is to have the patient sit up and pinch his/her nostrils shut. If you tip the head back, the blood will drain back into the throat and cause choking.

Spinal Cord Damage: Patients found lying face up with arms stretched out above the head could indicate damage to the cervical spine. It is recommended that you consider every unconscious injured patient to have neck and spinal injuries. Avoid moving the injured part of the patient or any of the limbs, unless he/she is in other immediate danger. Get help.
Problem 7.15 - Advanced Irrigation Components & Principles (Written Test)

Time Allowed: 45 minutes

Study Reference: Irrigation Concepts (Chapter 2) and Irrigation System Components and Maintenance (Chapter 5) in the Landscape Training Manual for Irrigation Technicians

Procedure: Score Weighting 100

This written test will be handed out and completed in the classroom.

You will be required to answer questions on the following:

1. Types of irrigation heads
2. Drip systems
3. Mainlines
4. Lateral lines
5. Valve boxes
6. Remote control valves
7. Rate of flow, friction loss, head loss
8. Programming
9. Pressure, output (GPM)
10. Soil properties, runoff, infiltration
11. Backflow prevention
12. Precipitation rate
13. Volt/OHM meter
14. Controllers

Safety component 0

Maximum score 100
Problem 7.16 - Irrigation Plan Reading (Written Test)

Time Allowed: 30 minutes

Study Reference: Irrigation Plan Reading (Chapter 4) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

You are given an irrigation landscape plan showing some of the details in a residential yard. It is inefficient to keep going back for additional materials, so your employer has put you in charge of calculating the materials needed for this job. First, you need to be familiar with the scale on the plan and using an architect scale. Incorrect use of the architect scale will result in major errors, so be very careful. Reading the North arrow is also important. You will be required to do some simple counting of items on the plan, but study the plan carefully to make sure you have counted them all. You are also required to calculate GPM for one zone. A formula is provided for you to calculate precipitation rate. All you need to do is calculate the area using your scale and add up the GPM for each nozzle in that zone.

Procedure:        Score Weighting   100

This written test will be handed out and completed in the classroom.

You will be required to answer questions on the following:

1. Basic plan reading
2. Numbers of heads, valves and hose bibs
3. Length of pipe
4. Water output (GPM) per station/zone
5. Precipitation rate

Safety component 0

Maximum score 100

Note: The plan provided for this problem is in English.
Problem 7.17 – Basic Horticultural Principles (Written Test)

Time Allowed: 15 minutes

Study Reference: Turf Installation (Chapter 10) and Plants and Planting (Chapter 11) in the Landscape Training Manual for Irrigation Technicians

Procedure: Score Weighting 100

This written test will be handed out and completed in the classroom.

You will be required to answer questions on the following:

1. Turf cultural requirements
2. Tree and shrub cultural requirements

Safety component 0

Maximum score 100
Problem 5.23, 7.23, 8.23, 9.23 - Lateral Repair and Head Adjustment

Time Allowed: 35 minutes

Study Reference: Irrigation System Components and Maintenance in the Landscape Training Manual for Installation or Maintenance (Chapter 10) or Irrigation (Chapter 5) Technicians.

Your Task Today

You arrive at a job site and are told an underground irrigation pipe has been damaged. You must first locate the problem, safely repair the line and flush the system. While you are on site, the homeowner asks that you adjust three sprinkler heads. Just your luck, each sprinkler head is different. Adjust these to ensure proper coverage.

Procedure:                                      Score Weighting

Preparation                                      10

1. Turn on water to locate broken water line.
2. Expose the lateral pipe and remove an appropriate section of pipe.

Repair break                                      30

   Properly repair the break.

Repair testing and completion                     20 (+DQ)

   1. Flush lines and clean sprinklers.
   2. Test the repair.

Head adjustment                                  20 (+DQ)

   Properly adjust 3 heads, as directed by the judge, for proper spray of given area.
   (3 different types of heads)

Safety component                                  20

Maximum score                                    100

NOTE: Candidates will be responsible for adjusting any brand or type of head common to that region.
Problem 7.71 – Advanced Program Controller

**Time Allowed:** 15 minutes

**Study Reference:** Irrigation System Components and Maintenance in the Landscape Training Manual for Irrigation (Chapter 5) Technicians.

**Your Task Today**

You have arrived at a work site and find the homeowner has changed the watering program on an irrigation controller. Program this controller including correct date and time using the instructions provided by your company. Demonstrate how to manually activate one zone.

### Procedure:

<table>
<thead>
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<tr>
<td>15</td>
</tr>
<tr>
<td>70</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

#### Initial programming

1. Set to current day
2. Set to current time
3. Clear other programs

#### Irrigation programming

Program the solid-state controller according to the following:

**Program A**

1. Stations (zones) 1 and 2 are newly seeded turf areas.
2. Watering run time shall be 6 minutes.
3. These zones will be irrigated 7 days a week.
4. Two cycles with start times: 5:00 A.M. and 1:00 P.M.

**Program B**

1. Station (zone) 3 is an established shrub area on a drip system.
2. Watering run times shall be 45 minutes.
3. Station (zone) 4 is an established lawn area with gear-driven rotors.
4. Watering run time shall be 60 minutes.
5. Once cycle with start time: 6:00 A.M.
6. These zones will be watered every Tuesday and Friday.

#### Manual operation

Demonstrate to the judge how to manually activate Station (zone) 4.

**Maximum score**

100

**Note:** Candidates will be responsible for adjusting any brand or type of controller common to that region.
Problem 7.72 - Lateral Installation

Time Allowed: 35 minutes

Study Reference: Irrigation System Components and Maintenance (Chapter 5) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

Your employer gives you the plan found on the following page and sends you to install these lateral lines and four heads. Just your luck, each head is installed a bit differently. Use your scale carefully to measure all the lengths of pipe required. Watch those details and be careful out there.

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<tr>
<td><strong>Irrigation layout</strong></td>
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<tr>
<td>1. Review detail drawing of irrigation lateral plan.</td>
<td></td>
</tr>
<tr>
<td>2. Install lateral lines according to the scale and detail of the irrigation plan.</td>
<td></td>
</tr>
<tr>
<td><strong>Head installation</strong></td>
<td>35</td>
</tr>
<tr>
<td>1. Review detail drawings of irrigation head installation.</td>
<td></td>
</tr>
<tr>
<td>2. Clean previously dug trench.</td>
<td></td>
</tr>
<tr>
<td>3. Install pop-up spray head according to detail drawing.</td>
<td></td>
</tr>
<tr>
<td>4. Backfill and grade around head only, according to detail drawing.</td>
<td></td>
</tr>
<tr>
<td>5. Install bubbler head above ground according to the detail drawing.</td>
<td></td>
</tr>
<tr>
<td>6. Install pop-up rotor above ground according to the detail drawing.</td>
<td></td>
</tr>
<tr>
<td>7. Install pop-up impact above ground according to the detail drawing.</td>
<td></td>
</tr>
<tr>
<td><strong>Safety component</strong></td>
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</tr>
<tr>
<td><strong>Maximum score</strong></td>
<td>100</td>
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</tbody>
</table>
Problem 7.72 - Lateral Installation

IRRIGATION PLAN

SCALE 1/2" = 1' 0"

0 1 2 3 4 FT

REMOTER CONTROL VALVE ASSEMBLY

POPP-UP SPRAY SPRINKLER ASSEMBLY

HEADER BOARD

POPP-UP IMPACT SPRINKLER ASSEMBLY

POPP-UP ROTOR SPRINKLER ASSEMBLY

BUBBLER HEAD SPRINKLER ASSEMBLY

NOTES:
- POP-UP SPRAY TO BE ASSEMBLED AS PER DETAIL
- REMAINDER TO BE ASSEMBLED AT GROUND LEVEL
- ALL CONSTANT PRESSURE PIPE TO BE CLASS 200 PVC
- ALL NON-PRESSURE PIPE TO BE CLASS 160 PVC
- ALL MEASUREMENTS ARE FROM CENTER OF FITTING OR HEAD
Problem 7.72 - Lateral Installation

POP-UP SPRAY SPRINKLER DETAIL NO SCALE

NOTE: Spray head may be assembled using either a swing pipe or a rigid PVC riser as specified by state or provincial code.
Problem 7.72 - Lateral Installation

BUBBLER HEAD ON RISER DETAIL  NO SCALE

NOTE: Use pipe and fittings specified by state or provincial code.
Problem 7.72 - Lateral Installation

POP-UP ROTOR SPRINKLER DETAIL

NOTE: Rotor Head may be assembled using either a rigid PVC riser or swing pipe as specified by state or provincial code.
Problem 7.72 - Lateral Installation

POP-UP IMPACT SPRINKLER DETAIL      NO SCALE

NOTE: Impact Head may be assembled using either a rigid PVC riser or swing pipe as specified by state or provincial code.
Problem 7.73 - Mainline Installation

Time Allowed: 35 minutes

Study Reference: Irrigation System Components and Maintenance (Chapter 5) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

Mainline installation involves important steps in the success of the irrigation system. Your employer wants to see that you can follow each step before you are sent out to a work site. Study the drawings on the following pages first. You will only need to show once that you can safely and correctly complete a solvent weld of high-pressure pipe, the remainder can be dry-fitted. Next, assemble the backflow prevention device. You only need to show once that you can correctly seal and tighten one threaded fitting. Two views are drawn of the quick coupler valve to help with the next step. Install a remote control valve next. Pay attention to the scale on the irrigation plan for these last two steps. Finally, you will need to show you can sweat fit one copper fitting. Think safety here.

Procedure:          Score Weighting

Irrigation layout            10
1. Review detail drawing of irrigation plan.
2. Assemble according to the scale and detail of the irrigation plan.

Pipe and fittings connections          20
1. The judge will give you a fitting and length of high-pressure pipe to cut.
2. Solvent weld the fitting to one of the cut ends of the pipe.
3. Sweat fit copper fitting on copper pipe provided by the judge.

Installation of water regulation device         35
1. Select the backflow prevention device.
2. Install above ground according to the detailed drawing.
3. Tighten one threaded fitting using Teflon tape or pipe thread compound.
5. Select quick coupler valve.
6. Install above ground according to the detail drawing and irrigation plan.
7. Do not solvent weld.
8. Select a remote control valve.
9. Install above ground according to the irrigation plan.
10. Do not solvent weld.

The mainline installation details are found on the next pages. The irrigation plan is drawn to scale.

Safety component            35 (+DQ)

Maximum score            100
Problem 7.73 - Mainline Installation

IRRIGATION PLAN

SCALE 1/2" = 1' 0"

0 1 2 3 4 FT

1" POINT OF CONNECTION (P.O.C.)

REDUCED PRESSURE ASSEMBLY

QUICK COUPLING VALVE ASSEMBLY

1" MAINLINE

REMOTE CONTROL VALVE ASSEMBLY

NOTES:
- TO BE ASSEMBLED AT GROUND LEVEL
- ALL CONSTANT PRESSURE PIPE TO BE CLASS 200 PVC
- ALL NON-PRESSURE PIPE TO BE CLASS 160 PVC
- ALL MEASUREMENTS FROM CENTER OF VALVE OR PIPE
Problem 7.73 - Mainline Installation

BACK FLOW DETAIL       NO SCALE

NOTE: Use pipe, backflow device and fittings specified by state or provincial code.
Problem 7.73 - Mainline Installation

QUICK COUPLING VALVE DETAIL

SIDE VIEW          FRONT VIEW

Stainless Steel Clamps (2)

Quick Coupling Valve

1/2" x 18" Rebar Stake

1" x 10" Schedule 80 PVC Nipple

Schedule 80 PVC 90 Degree Elbow

1" x 3" Schedule 80 PVC Nipple

1" x 12" Schedule 80 PVC Nipple

Irrigation Main Line

Schedule 80 PVC 90 Degree Elbow

1" x 3" Schedule 80 PVC Nipple

NOTE: Use irrigation mainline and tee as specified by state or provincial code.
Problem 7.74 - Valve Repair

Time Allowed: 35 minutes

Study Reference: Irrigation System Components and Maintenance (Chapter 5) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

| A customer has called you out to fix problems in the irrigation system. Nothing is working and the customer has tried everything. You now know you will need to check all three valves to find all of the problems. There may be problems with the solenoids. Parts may be missing. Wires may be broken or disconnected. Your OHM meter may pick up additional problems. Your customer wants to see you get each valve working. |

Procedure: | Score Weighting
---|---
General procedures | 15

During the valve repair steps below, you must demonstrate proper use of connectors, valves and OHM meter.

Valve repair | 75 (+DQ)

1. Review all tools, instruments and materials available to complete repairs.
2. Review the problem with the three valves, controller and wiring.
3. Make necessary repairs.
4. Test the repairs.

Safety component | 10

Maximum score | 100
Problem 7.75 - Valve Wiring

Time Allowed: 35 minutes

Study Reference: Irrigation System Components and Maintenance (Chapter 5) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

The objective of this problem is to safely demonstrate your ability to install low voltage irrigation system wiring as per the provided instructions and detail. Your co-worker has started the manifold and valve installation. The controller is already installed. You are sent to complete the wiring and test the system. Only one pre-filled wire connector needs to be used. The rest of the connections will be made with wire nuts. Test your handiwork when complete.

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<tr>
<td>Wire connection</td>
<td>15</td>
</tr>
<tr>
<td>1. Review detail drawing of wire connection.</td>
<td></td>
</tr>
<tr>
<td>2. Disconnect from 120V.</td>
<td></td>
</tr>
<tr>
<td>3. Connect two pieces of 14 gauge direct burial wire according to wire connection detail drawing.</td>
<td></td>
</tr>
<tr>
<td>Wiring controller</td>
<td>25</td>
</tr>
<tr>
<td>1. Review controller.</td>
<td></td>
</tr>
<tr>
<td>2. Run low voltage wires from controller to remote control valves through conduit.</td>
<td></td>
</tr>
<tr>
<td>Use fish tape provided.</td>
<td></td>
</tr>
<tr>
<td>3. Connect low voltage wires to controller.</td>
<td></td>
</tr>
<tr>
<td>4. Common wire shall be white.</td>
<td></td>
</tr>
<tr>
<td>Wiring valves</td>
<td>25</td>
</tr>
<tr>
<td>1. All wire shall be coiled a minimum of 24” in valve box (or approx. 20 wraps around 3/4” PVC).</td>
<td></td>
</tr>
<tr>
<td>2. Connect low voltage wires to the remote control valves using wire nuts.</td>
<td></td>
</tr>
<tr>
<td>System activation</td>
<td>25</td>
</tr>
<tr>
<td>Activate remote control valves by using the controller.</td>
<td></td>
</tr>
<tr>
<td>Safety component</td>
<td>10 (+DQ)</td>
</tr>
<tr>
<td>Maximum score</td>
<td>100</td>
</tr>
</tbody>
</table>

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Problem 7.75 - Valve Wiring

WIRE CONNECTION DETAIL  NO SCALE

Pre-Filled Wire Connector

Crimp Sleeve or Wire Nut

Strip Wire 3/8" From End.
Twist Wire Ends Together.
Insert Ends Into Sleeve And Crimp.

Push Wires Into Jell
And Close Lid Securely
**Problem 7.76A - Pipe Installation Equipment (Trencher)**

**Time Allowed:** 35 minutes

**Study Reference:** Irrigation Installation Equipment and Safety (Chapter 8) in the Landscape Training Manual for Irrigation Technicians

**Your Task Today**

The underground utilities have just been marked. Once you are sure of their location, check if the machine is ready to use. You only need to dig a single trench, then backfill and fine grade using the tools provided.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Score Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment check</strong></td>
<td>10</td>
</tr>
<tr>
<td>Check trencher to see if it is mechanically fit to start.</td>
<td></td>
</tr>
<tr>
<td><strong>Trenching</strong></td>
<td>10 (+DQ)</td>
</tr>
<tr>
<td>1. Start the trencher.</td>
<td></td>
</tr>
<tr>
<td>2. Trench a ditch 18 inches deep and 15 feet long.</td>
<td></td>
</tr>
<tr>
<td><strong>Backfilling</strong></td>
<td>15</td>
</tr>
<tr>
<td>1. Backfill trench.</td>
<td></td>
</tr>
<tr>
<td>2. Fine grade.</td>
<td></td>
</tr>
<tr>
<td><strong>Safety component</strong></td>
<td>65 (+DQ)</td>
</tr>
<tr>
<td><strong>Maximum score</strong></td>
<td>100</td>
</tr>
</tbody>
</table>
Problem 7.76B - Pipe Installation Equipment (Pipe Puller)

Time Allowed: 35 minutes

Study Reference: Irrigation Installation Equipment and Safety (Chapter 8) in the Landscape Training Manual for Irrigation Technicians

Your Task Today

The underground utilities have just been marked. Once you are sure of their location, check if the machine is ready to use. The three flags indicate where heads will be located. Make sure you run the pipe at the correct depth where these heads are to be located.

Procedure: Score Weighting

<table>
<thead>
<tr>
<th>Equipment check</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check pipe puller to see if it is mechanically fit to start.</td>
<td></td>
</tr>
</tbody>
</table>

Pipe puller operation

| 25 (+DQ) |
|--------------------------|----|
| Start the pipe puller. |
| Pull pipe 12” deep through flags. |

Safety component

| 65 (+DQ) |
|--------------------------|----|

Maximum score

| 100 |
|--------------------------|----|