



ESSENTIALS

OF FIRE FIGHTING

COURSE WORKBOOK



IFSTA
INTERNATIONAL FIRE SERVICE TRAINING ASSOCIATION

Scene Lighting, Rescue Tools, Vehicle Extrication, and Technical Rescue

Terms

Write the definition of the terms below on the blanks provided.

1. **Extrication (479)** _____

2. **Generator (480)** _____

3. **Power Take-Off (PTO) System (480)** _____

4. **Inverter (481)** _____

5. **Intrinsically Safe (483)** _____

6. **Ground Fault Circuit Interrupter (GFCI) (484)** _____

True/False

Write True or False on the blanks provided; if False, write the correct statement on the lines provided.

- _____ 1. Electric generators are the most common power source used by emergency services personnel. (480)

-
- _____ 2. Vehicle-mounted generators produce less power than portable units. (480)
- _____
- _____
- _____ 3. Lighting equipment can be divided into three categories. (481)
- _____
- _____
- _____ 4. Fixed lights are used to provide overall lighting of the emergency scene. (481)
- _____
- _____
- _____ 5. All auxiliary electrical equipment must be waterproof, intrinsically safe, and designed for the amount of electrical current it is intended to carry. (483)
- _____
- _____
- _____ 6. Junction boxes provide a connection supplied through multiple inlets from a power source. (484)
- _____
- _____

Identification

Write the correct answers on the blanks provided.

Lighting and Auxiliary Electrical Equipment (483-484)

Identify the piece of lighting and auxiliary electrical equipment in the images below.



1. _____



2. _____



3. _____



4. _____



5. _____



6. _____

Terms

Write the definition of the terms below on the blanks provided.

1. **Arc (484)** _____

2. **Stabilization (493)** _____

3. **Wheel Chock (495)** _____

4. **Cribbing (496)** _____

5. **Pretensioner (506)** _____

6. **B-Post (519)** _____

7. **Safety Glass (522)** _____

8. **Tempered Glass (522)** _____

9. **Nader Pin (526)** _____

10. **Unibody Construction (527)** _____

11. Case-Hardened Steel (528) _____

12. Secondary Collapse (538) _____

13. Hypothermia (542) _____

14. Low-Head Dam (542) _____

15. Lockout/Tagout Device (545) _____

16. Ground Gradient (549) _____

True/False

Write True or False on the blanks provided; if False, write the correct statement on the lines provided.

_____ 1. Electric rescue tools may be less powerful than those with other power sources. (487)

_____ 2. Most electric rescue tools are vehicle repair tools adapted to fire service use. (490)

_____ 3. Jacks should always be placed on a flat, level surface. (493)

-
- _____ 4. Wheel chocks can hold a vehicle in place on a 20 to 25 percent grade. (495)
- _____
- _____
- _____ 5. Synthetic fiber cable used for winches is not as strong as steel cable. (500)
- _____
- _____
- _____ 6. Firefighters should only use recommended types of lubricants, hydraulic fluids, and fuel grades when performing maintenance on rescue tools. (503)
- _____
- _____
- _____ 7. During vehicle extrication, it may be necessary to activate foam-generating systems and deploy several charged lines. (508)
- _____
- _____
- _____ 8. A buttress tension system is used to stabilize vehicles that are upside down or lying on a side. (516)
- _____
- _____
- _____ 9. Seat belt pretensioners lock before a crash to prevent further travel. (519)
- _____
- _____
- _____ 10. Firefighters can use duct tape to form handles that will help carry or control broken glass. (526)
- _____
- _____
- _____ 11. When removing a vehicle roof, always place a step chock under the A-post. (527)
- _____
- _____

-
- _____ 12. The next priority after stabilizing the incident scene is to establish scene security. (533)
- _____
- _____
- _____ 13. Confined space rescue operations may take place in a location that is designed for continuous occupancy. (538)
- _____
- _____
- _____ 14. When at water rescue operations assisting technical teams, firefighters may wear structural PPE for warmth. (541)
- _____
- _____
- _____ 15. During wilderness rescue operations in hot climates, wearing structural PPE for protection is recommended. (543)
- _____
- _____
- _____ 16. The handrails and steps of an escalator move at different rates. (546)
- _____
- _____

Identification

Write the correct answers on the blanks provided.

Powered Rescue Tools (489-490)

Identify the powered rescue tool in the images below.



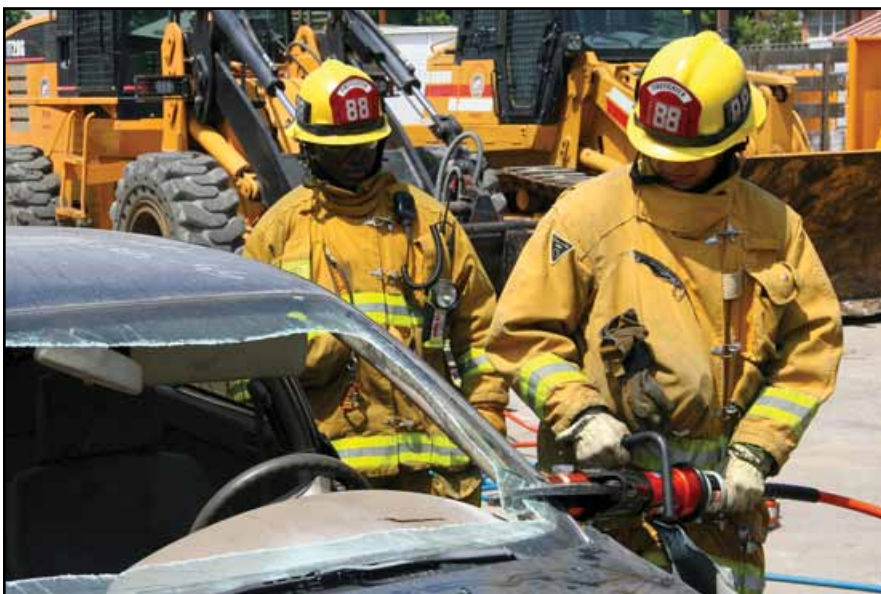
1. _____



2. _____



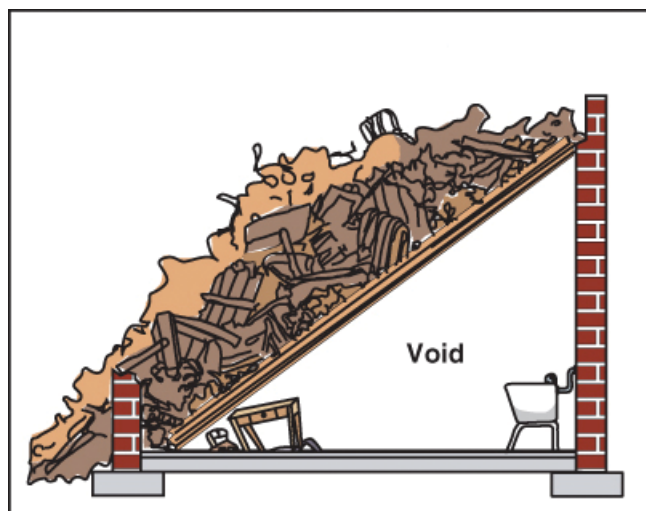
3. _____



4. _____

Structural Collapse Patterns (536-537)

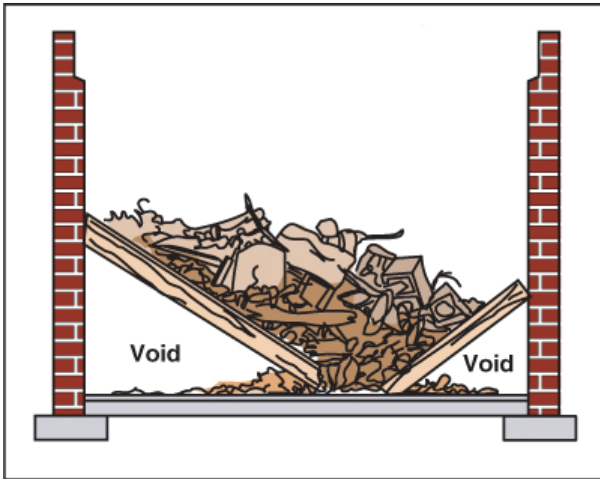
Identify the structural collapse pattern in the images below.



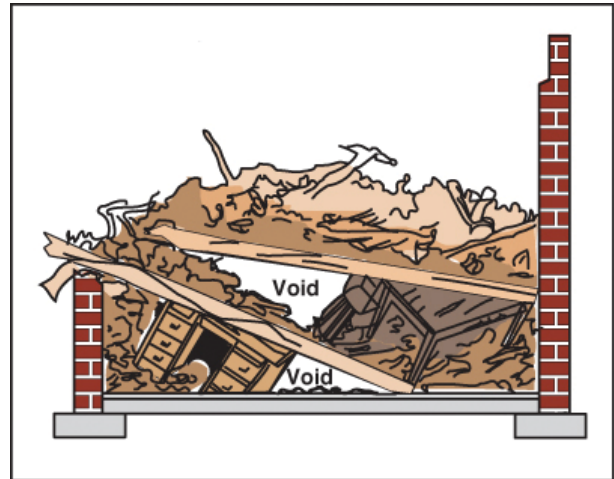
1. _____



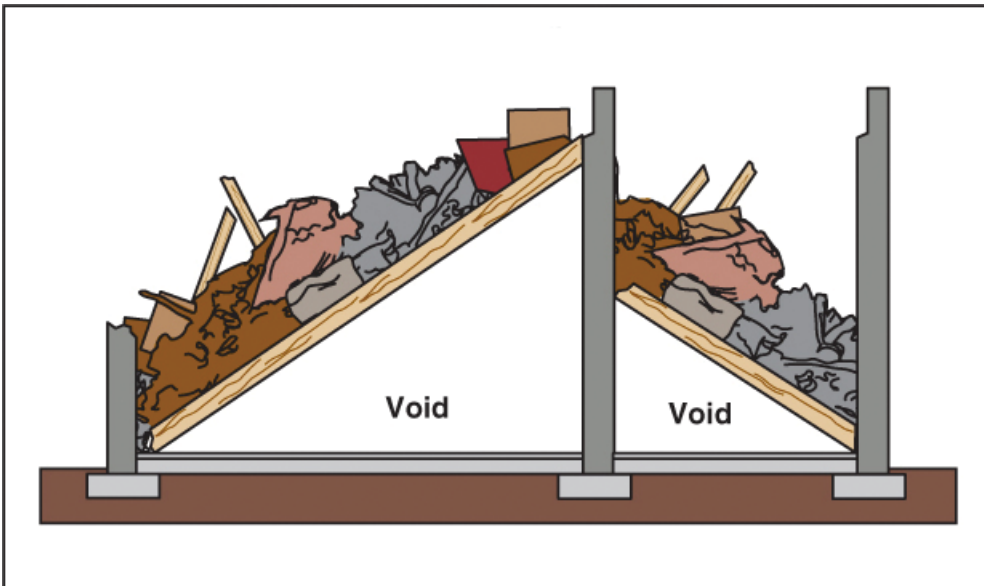
2. _____



3. _____



4. _____



5. _____

Matching

Write the correct answers on the blanks provided.

Rescue Tool Uses

Match the definition with the rescue tool use listed. Each choice will be used once.

- | | |
|---|---------------------|
| _____ 1. Ensuring that the vehicle or structural member will not move during rescue (486) | A. Cutting |
| _____ 2. Dragging away materials to free a victim (486) | B. Lifting |
| _____ 3. Removing materials or debris to free a victim (486) | C. Pulling |
| _____ 4. Securing materials in place or breaking up materials to free a victim (486) | D. Stabilizing |
| _____ 5. Raising vehicle, vehicle component, or structural member off victim or raising victim out of a space (486) | E. Other activities |

Cutting Tools

Match the definition with the correct cutting tool listed. Each choice will be used once.

- | | |
|--|----------------------|
| _____ 1. Tool that can have large-toothed blades used for rough cuts or fine-toothed blades for precision cuts (491) | A. Air chisel |
| _____ 2. Tool often used for delicate cutting operations (492) | B. Rotary saw |
| _____ 3. Tool that operates at pressures between 90 and 250 psi (630 and 1 750 kPa) (492) | C. Circular saw |
| _____ 4. Tool that is versatile, lightweight, and is available in a battery-powered model (492) | D. Whizzer saw |
| _____ 5. Tool that has a short, straight blade that moves in and out (491) | E. Reciprocating saw |

Stabilizing Tools

Match the definition with the correct stabilizing tool listed. Each choice will be used once.

- | | |
|--|----------------------------|
| _____ 1. The least stable of this type of tool, also known as high-lift (494) | A. Wheel chocks |
| _____ 2. Designed for heavy lifting, used to tighten opposing members in shoring system (493) | B. Hydraulic jack |
| _____ 3. Can hold a vehicle in place on a 10 to 15 percent grade (495) | C. Bar screw jack |
| _____ 4. Consists of wooden or plastic blocks of varying lengths (496) | D. Trench screw jack |
| _____ 5. Uses threaded stem component system to operate, primarily used to hold object in place (493) | E. Ratchet-lever jack |
| _____ 6. Arrangement of at least three 4 x 4 (101 by 101 mm) posts wedged between the ground and vehicle (495) | F. Cribbing materials |
| _____ 7. Has two swivel footplates that adjust on a threaded system, replace wooden cross braces during rescue (494) | G. Buttress tension system |

Multiple Choice

Write the correct answers on the blanks provided.

- _____ 1. Which of the following should be consulted if a problem is found during routine maintenance of a generator? (484)
- A. Supervisor
 - B. The internet
 - C. The manual
 - D. Division commander
- _____ 2. Which of the following devices powers most powered rescue tools? (488)
- A. Come-alongs
 - B. Manual power
 - C. Pneumatic power
 - D. Hydraulic pumps
- _____ 3. What tool uses paint on the ends of blocks to indicate length? (496)
- A. Wheel chocks
 - B. Cribbing material
 - C. Ratchet-lever jacks
 - D. Combination spreader/shears
- _____ 4. Which of the following BEST describes a disadvantage of plastic cribbing? (496)
- A. It is lighter and lasts longer.
 - B. It may slip under wet conditions.
 - C. It cannot be contaminated by absorbing oil or fuel.
 - D. It can be locally constructed or commercially purchased.
- _____ 5. Which of the following BEST describes scene size-up during vehicle extrication? (504)
- A. Size-up ends after firefighters arrive on scene.
 - B. Size-up helps identify potential hazards on scene.
 - C. Size-up begins only when firefighters arrive on scene.
 - D. Size-up is performed by the first arriving firefighter and then it ends.
- _____ 6. Which of the following can be used to supplement chocks during vehicle stabilization? (514)
- A. Impact tools
 - B. Come-alongs
 - C. Operable mechanical system in the vehicle
 - D. Inoperable mechanical system in the vehicle

- _____ 7. Which of the following BEST describes a disadvantage of using a lifting jack? (515)
- A. It is time-consuming to place.
 - B. It may be inserted into tight spaces.
 - C. It may deflate, causing vehicle to shift.
 - D. It can be adjusted to the required height.
- _____ 8. Which of the following BEST describes a possible disadvantage for using pneumatic lifting bags? (515)
- A. Bags are time-consuming to place.
 - B. Bags can be damaged or jarred loose.
 - C. Bags may be inserted into tight spaces.
 - D. Bags can be adjusted to the required height.
- _____ 9. Which of the following BEST describes how to disconnect the electrical system in an electric vehicle? (518)
- A. Just the same as in a conventional vehicle.
 - B. Use the disarming key code for the vehicle.
 - C. The opposite way as in a conventional vehicle.
 - D. There is no way to disconnect the electrical system.
- _____ 10. Which of the following passenger safety systems can deploy even after the battery has been disconnected? (520)
- A. Seat belt pretensioners
 - B. Head protection systems (HPS)
 - C. Extendable roll over protection systems (ROPS)
 - D. Supplemental passenger restraint systems (SPRS)
- _____ 11. Which of the following passenger safety systems comes in two main types: window curtains and inflatable tubes? (521)
- A. Seat belt pretensioners
 - B. Head protection systems (HPS)
 - C. Extendable roll over protection systems (ROPS)
 - D. Supplemental passenger restraint systems (SPRS)
- _____ 12. Which of the following passenger safety systems will deploy if the vehicle becomes weightless for at least 80 milliseconds? (522)
- A. Seat belt pretensioners
 - B. Head protection systems (HPS)
 - C. Extendable roll over protection systems (ROPS)
 - D. Supplemental passenger restraint systems (SPRS)

- _____ 13. What method of gaining access to victims is used after a front-end collision when victims are pinned under the steering wheel? (528)
- A. Removing the roof
 - B. Prying a door open
 - C. Removing a window
 - D. Displacing the dashboard
- _____ 14. All emergency services personnel working the incident are able to access the: (534)
- A. hot zone.
 - B. cold zone.
 - C. warm zone.
 - D. decontamination zone.
- _____ 15. What type of structural collapse pattern occurs when one outer wall fails while the opposite wall remains intact? (538)
- A. Pancake
 - B. Lean-to
 - C. V-shaped
 - D. Cantilever
- _____ 16. When using the OATH method of communication during confined-space rescue, what does three tugs stand for? (540)
- A. O – ok
 - B. H – help
 - C. A – advance
 - D. T – take-up slack
- _____ 17. What type of device BEST fits the following characteristics: similar to freight, temporary installation? (545)
- A. Escalator
 - B. Passenger elevator
 - C. Limited-use elevator
 - D. Construction elevator
- _____ 18. What type of technical rescue involves physical hazards such as smoke, electrified rails, and standing water or other fluids? (548)
- A. Cave rescue
 - B. Mine rescue
 - C. Tunnel rescue
 - D. Vehicle rescue

Short Answer

Write the correct answers on the blanks provided.

1. What are five of the questions that should be answered during size-up? (504)

2. What are the five hazards a firefighter must be aware of during vehicle extrication? (505)

3. What are the initial actions a Firefighter II can perform after reaching a technical rescue operation scene? (532)

Scenario

Read the scenario below, and then identify the lifting bag safety rules that were violated or not followed during the operation described.

Engine 127 and Rescue 127 are dispatched to a vehicle extrication incident involving a passenger vehicle that had left the roadway and collided with trees in a wooded area. After arriving on scene the crew finds a minivan with two patients trapped inside and one patient pinned under the vehicle. The ground around the vehicle is covered with sharp gravel and stones. Also present on the scene are several shattered tree limbs that fell to the ground during the collision.

The Incident Commander relays the command to begin extrication using pneumatic lifting bags immediately. Firefighter 1 begins the operation by placing a low-pressure lifting bag under the vehicle. A second low-pressure lifting bag is placed on top of this to make sure there is enough lifting distance provided. Firefighters 2 and 3 begin to air up the top bag while Firefighter 1 slowly slides under the vehicle to reach the patient underneath. While inflating the bag, Firefighters 2 and 3 discover that their equipment does not have enough air to properly inflate the bags needed to lift the vehicle.

Lifting bag safety rules violated:

Crossword Puzzle

Across

3. Block placed against the outer curve of a tire to prevent the apparatus from rolling
6. Wooden or plastic blocks used to stabilize a vehicle during vehicle extrication or debris following a structural collapse
7. Post between the front and rear doors on a four-door vehicle, or the door-handle-end post on a two-door car
10. Wall-like concrete structure across a river or stream that is designed to back up water
12. Method of automobile construction in which the frame and body form one integral unit
13. Electrical field that radiates outward from where the current enters the ground
14. Steel used in vehicle construction whose exterior has been heat treated, making it much harder than the interior metal
16. Treated glass that is stronger than plate glass or a single sheet of laminated glass; safer than regular glass because it crumbles into chunks when broken, instead of splintering into jagged shards

Down

1. Device used to secure a machine's power switches in order to prevent accidental re-start of the machine
2. Preventing unwanted movement; accomplished by supporting key places between an object and the ground (or other solid anchor points)
4. Collapse that occurs after the initial collapse of a structure
5. Device that takes up slack in a seat belt; prevents the passenger from being thrown forward in the event of a crash
8. Two sheets of glass laminated to a sheet of plastic sandwiched between them
9. Bolt on a vehicle's door frame that the door latches onto in order to close
11. High-temperature luminous electric discharge across a gap or through a medium such as charred insulation
15. Abnormally low body temperature

