

# Answer Key

## Lesson # 3: Cold Temperature Clothing (*Personal Protective Equipment*)

### Correct Answers for Part 2:

- 1.) A. You should always layer your clothing in cold weather.
- 2.) B. To properly prevent Cold-Related Disorders, three layers of clothing are recommended:

--An inner layer of cotton or synthetic weave to allow ventilation.

-- A middle layer of wool or synthetic fabric (Qualofil or Pile) to absorb sweat and retain insulation in a damp environment. Down is a useful lightweight insulator; however, it is ineffective once it becomes wet.

-- An outer layer to break the wind and allow some ventilation (like Gore-Tex® or nylon);

3.) D. Pay special attention to protecting your feet, hands, face and head. Did you know that up to 40 percent of your body heat can be lost when the head is exposed? Footgear should be insulated to protect against cold and dampness. Another good idea is to keep a change of clothing available in case work garments become wet.

### Correct Answers for Part 4:

**Trench Foot** is caused by long, continuous exposure to a wet, cold environment, or actual immersion in water. Commercial fishermen, who experience these types of cold, wet environments daily, need to be especially cautious.

#### **Symptoms:**

Symptoms include a tingling and/or itching sensation, burning, pain, and swelling, sometimes forming blisters in more extreme cases.

#### **Treatment:**

Move individuals to a warm, dry area, where the affected tissue can be treated with careful washing and drying, re-warming and slight elevation. Seek medical assistance as soon as possible.

**Frostbite** occurs when the skin tissue actually freezes, causing ice crystals to form between cells and draw water from them, which leads to cellular dehydration. Although this typically occurs at temperatures below 30°F (-1°C), wind chill effects can cause frostbite at above-freezing temperatures.

#### **Symptoms:**

Initial effects include uncomfortable sensations of coldness; tingling, stinging or aching feeling of the exposed area followed by numbness. Ears, fingers, toes, cheeks, and noses are primarily affected. Frostbitten areas appear white and cold to the touch. The appearance of frostbite varies depending on whether re-warming has occurred.

Deeper frostbite involves freezing of deeper tissues (muscles, tendons, etc.) causing exposed areas to become numb, painless, hard to the touch.

#### **Treatment:**

If you suspect frostbite, you should seek medical assistance immediately. Any existing hypothermia should be treated first (See Hypothermia below). Frostbitten parts should be covered with dry, sterile gauze or soft, clean cloth bandages. Do not massage frostbitten tissue because this sometimes causes greater injury. Severe cases may require hospitalization and even amputation of affected tissue. Take measures to prevent further cold injury. If formal

medical treatment will be delayed, consult with a licensed health care professional for training on re-warming techniques.

**General Hypothermia** occurs when body temperature falls to a level where normal muscular and cerebral functions are impaired. While hypothermia is generally associated with freezing temperatures, it may occur in any climate where a person's body temperature falls below normal. For instance, hypothermia is common among the elderly who live in cold houses.

**Symptoms:**

The first symptoms of hypothermia, shivering, an inability to do complex motor functions, lethargy, and mild confusion, occur as the core body temperature decreases to around 95°F (35°C). As body temperature continues to fall, hypothermia becomes more severe. The individual falls into a state of dazed consciousness, failing to complete even simple motor functions. The victim's speech becomes slurred and his or her behavior may become irrational. The most severe state of hypothermia occurs when body temperature falls below 90°F (32°C). As a result, the body moves into a state of hibernation, slowing the heart rate, blood flow, and breathing. Unconsciousness and full heart failure can occur in the severely hypothermic state.

**Treatment:**

Treatment of hypothermia involves conserving the victim's remaining body heat and providing additional heat sources. Specific measures will vary depending upon the severity and setting (field or hospital). Handle hypothermic people very carefully because of the increased irritability of the cold heart. Seek medical assistance for persons suspected of being moderately or severely hypothermic. If the person is unresponsive and not shivering, assume he or she is suffering from severe hypothermia. Reduction of heat loss can be accomplished by various means: obtaining shelter, removal of wet clothing, adding layers of dry clothing, blankets, or using a pre-warmed sleeping bag.

For mildly hypothermic cases or those more severe cases where medical treatment will be significantly delayed, external re-warming techniques may be applied. This includes body-to-body contact (e.g., placing the person in a pre-warmed sleeping bag with a person of normal body temperature), chemical heat packs, or insulated hot water bottles. Good areas to place these packs are the armpits, neck, chest, and groin. It is best to have the person lying down when applying external re-warming. You also may give mildly hypothermic people warm fluids orally, but avoid beverages containing alcohol or caffeine.