CORE
Section A

1. **Ozone in the stratosphere above the earth consists of;**

   A: molecules containing 3 oxygen atoms.
   B: molecules of 2 oxygen atoms.
   C: radioactive particles.
   D: pollutants that have risen from ground level.

2. **Which compounds have the highest ozone depletion potential (ODP)?**

   A: HCFCs.
   B: HFCs.
   C: CFCs.
   D: All are equal.

3. **Which atom of the CFC molecule causes ozone depletion?**

   A: Fluorine.
   B: Chlorine.
   C: Carbon.
   D: Hydrogen.

4. **What characteristic(s) of CFCs make them more likely to reach the stratosphere than most other compounds containing chlorine?**

   A: CFCs neither dissolve in water nor break down into compounds that dissolve in water, so they do not rain out of the atmosphere.
   B: CFCs are lighter than other chlorine compounds, making it easier for them to float upward when released.
   C: CFCs are stored under pressure, causing them to jet upward when released.
   D: CFCs are attracted to ultraviolet radiation.

5. **Each chlorine atom in the stratosphere can destroy _____ ozone molecules.**

   A: 1
   B: 3
   C: 100,000
   D: Chlorine is not the element in refrigerant that harms ozone.

6. **HCFC refrigerants are;**

   A: more harmful to stratospheric ozone than CFCs.
   B: as harmful to stratospheric ozone as CFCs.
   C: less harmful to stratospheric ozone than CFCs.
   D: not harmful to stratospheric ozone.

14. **Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) have which of the following in common?**

- A: They have the same ozone depletion potential.
- B: They both contain hydrogen.
- C: They must be recovered before opening or disposing of appliances.
- D: They have the same saturation pressure at 70°F.

15. **The oils that will be employed with most of the HFC-134a refrigeration applications are:**

- A: esters.
- B: alkylbenzenes.
- C: whale oils.
- D: All oils are compatible with HFC-134a.

16. **Which of the following is an approved "drop-in" service replacement for R-12?**

- A: HFC-134a.
- B: HFC-125.
- C: CFC-502.
- D: None of the above.

17. **Refrigerant entering the compressor of a refrigeration system is a;**

- A: liquid.
- B: sub-cooled liquid.
- C: sub-cooled vapor.
- D: superheated vapor.

18. **Manufacturers often color code the exterior of gauges. On a typical gauge manifold set, the high pressure gauge is color coded;**

- A: green.
- B: yellow.
- C: blue.
- D: red.

19. **Removing refrigerant in any condition from a system and storing it in an external container without necessarily testing or processing it in any way defines;**

- A: recycling.
- B: recovering.
- C: reclaiming.
- D: restoring.

20. **If a system will not hold a vacuum after it has been evacuated, then;**

- A: the system is ready to be charged.
- B: the system has been adequately evacuated.
- C: the system may be leaking.
- D: an expansion valve is clogged.

TYPE I

1. **EPA regulations include which of the following in the definition of a "small appliance"?**

   A: Products manufactured, charged and hermetically sealed in a factory.
   B: Products having 5 pounds or less of refrigerant.
   C: Products with compressors under ½ horsepower.
   D: Both "A" and "B".

2. **Recovery equipment used during maintenance, service or repair of small appliances must be certified by an EPA-approved laboratory if manufactured AFTER:**

   A: July 1, 1992.
   B: July 1, 1993.
   C: May 13, 1993.
   D: November 15, 1993.

3. **The sale of CFC and HCFC refrigerants is;**

   A: banned.
   B: limited by law to equipment owners.
   C: allowed only if there is proof of need.
   D: restricted to technicians who are EPA certified in refrigerant recovery.

4. **When servicing a small appliance for leak repair;**

   A: it is mandatory to repair the leak within 30 days.
   B: it is mandatory to repair the leak only when 35% of the charge escapes within a 12 month period.
   C: it is not mandatory to repair the leak but do so whenever possible.
   D: Both "A" and "B".

5. **If EPA regulations change after a technician becomes certified;**

   A: the technician certification is "grandfathered" for one year to allow time for re-certification.
   B: it will be the technician's responsibility to comply with any future changes in the law.
   C: a new certification test must be taken to be re-certified.
   D: Both "A" and "C".

6. **EPA rules require capture of 80% of the refrigerant from a small appliance sealed system with a non-operating compressor if technicians are using;**

   A: a system-dependent (passive) process.
   B: a self-contained (active) process.
   C: Either recovery process.
   D: Neither recovery process.

13. **Using the system-dependent (passive) recovery process, which condition requires the accessing both the high and low side of the system for refrigerant recovery?**

A: When there is a leak in the system.
B: When the compressor operates normally.
C: When the compressor only runs at half speed.
D: When the compressor does not run.

14. **Which of the following refrigerants must be recovered with equipment currently regulated by the equipment certification requirements of the EPA under Section 608?**

A: Sulfur dioxide.
B: Methyl chloride.
C: Methyl formate.
D: R-12.

15. **The system-dependent (passive) recovery process for small appliances;**

A: never needs the use of a pump or heat to recover refrigerant.
B: must use a pressure relief device when recovering refrigerant.
C: captures refrigerant in a non-pressurized container.
D: can only be performed on a system with an operating compressor.

16. **Before beginning a refrigerant recovery procedure it is ALWAYS necessary to;**

A: allow the appliance to stabilize at room temperature.
B: know the type of refrigerant that is in the system.
C: remove the appliance to an outdoor location.
D: disconnect the appliance from its power source.

17. **If a reclamation facility receives a tank of mixed refrigerant, they may;**

A: refuse to process the refrigerant and return it at the owner's expense.
B: agree to destroy the refrigerant, but typically a substantial fee is charged.
C: resell the refrigerant for reuse in its current state.
D: Both "A" and "B".

18. **It is generally recommended that piercing-type valves be used on which of the following tubing materials?**

A: Copper.
B: Aluminum.
C: Steel.
D: Both "A" and "B".

19. **When filling a graduated charging cylinder, refrigerant that is vented off the top of the cylinder;**

A: need not be recovered.
B: must be recovered.
C: is considered a "de minimis" release.
D: None of the above.

TYPE II

1. **After installation of a field-piped split system, the unit should first be;**

   A: evacuated.
   B: pressurized with R-22/leak checked.
   C: pressurized with R-12/leak checked.
   D: pressurized with nitrogen/leak checked.

2. **Many refrigeration units use an open compressor. Which part of the compressor is most likely to leak if a unit is not used for several months?**

   A: The suction service valve.
   B: The rotating shaft seal.
   C: The oil drain plug.
   D: The discharge service valve.

3. **EPA regulations require that all appliances containing more than 50 pounds of refrigerant (except for commercial and industrial process refrigeration) be repaired when the leak rate exceeds _____ percent of the charge per year.**

   A: 0
   B: 15
   C: 25
   D: 35

4. **EPA regulations require that leaking commercial and industrial process refrigeration be repaired when the leak rate exceeds _____ percent of the charge per year.**

   A: 0
   B: 15
   C: 25
   D: 35

5. **Refrigerant has been recovered from an air-conditioning system and held in a refillable cylinder, in order to replace the condenser coil. The refrigerant;**

   A: can probably be charged back into the system.
   B: should probably be replaced with R-123.
   C: must be reclaimed.
   D: must be destroyed.

6. **Your recovery/recycling machine has R-502 refrigerant in it. You now have to recover refrigerant from a unit with R-22. What must be done before the R-22 refrigerant can be recovered/recycled?**

   A: Nothing, as long as the recovery machine is not full.
   B: Change the expansion valve on the recovery machine.
   C: Change the filter and expansion valve on the recovery machine.
   D: Recover as much of the R-502 from the recovery unit as possible, change filter, and evacuate.

14. **Appliances containing CFC refrigerants can be evacuated to atmospheric pressure when;**

A: **the repair is major.**
B: **the repair is followed by an evacuation of the appliance to the environment.**
C: **leaks in the appliance make evacuation to the prescribed level unattainable.**
D: **the appliance is being disposed.**

15. **You are changing out the compressor of a system containing 40 pounds R-502. Your recycling equipment was manufactured AFTER November 15, 1993. In addition to isolating the compressor as much as possible, which of the following procedures should you follow?**

A: **Simply remove the compressor.**
B: **Evacuate the isolated section of the system to atmospheric pressure, then remove the compressor.**
C: **Evacuate the isolated section of the system to 10 inches of vacuum and hold. If system pressure does not rise, remove the compressor.**
D: **Evacuate the isolated section of the system to 15 inches of vacuum and hold. If system pressure does not rise, remove the compressor.**

16. **Which of the following statements is NOT true of recycling and recovery equipment manufactured AFTER November 15, 1993?**

A: **It must be tested by an EPA-approved third party.**
B: **It must meet vacuum standards more stringent than those met by equipment manufactured BEFORE November 15, 1993.**
C: **It must be equipped with low-loss fittings.**
D: **It must have an oil separator.**

17. **When using recovery and recycling equipment manufactured BEFORE November 15, 1993, technicians must evacuate an appliance containing 10 pounds of CFC-500 to the following level before disposing of the appliance:**

A: **0 psig.**
B: **4 inches of Hg vacuum.**
C: **10 inches of Hg vacuum.**
D: **15 inches of Hg vacuum.**

18. **When using recovery and recycling equipment manufactured AFTER November 15, 1993, technicians must evacuate an appliance component containing MORE than 200 pounds of CFC-12 to the following level before making a major repair:**

A: **0 psig.**
B: **4 inches of Hg vacuum.**
C: **10 inches of Hg vacuum.**
D: **15 inches of Hg vacuum.**

TYPE III

1. **Charged low pressure refrigeration machines may be most efficiently leak checked by;**

   A: adding dry nitrogen.
   B: adding HCFC-22.
   C: raising system pressure by heating with circulated hot water or heating blankets.
   D: operating the purge system.

2. **A hydrostatic tube test kit will;**

   A: determine if a tube leaks.
   B: blow all water out of tubes.
   C: remove water from a machine.
   D: vent refrigerant to the atmosphere.

3. **Where would you place a leak detector probe to check gas leaks into the water box with water removed?**

   A: At the rupture disc.
   B: Through the vent valve.
   C: Through a test plug.
   D: Through a drain valve.

4. **EPA regulations require that leaking commercial and industrial process refrigeration be repaired when the leak rate exceeds _____ percent of the charge per year.**

   A: 0
   B: 15
   C: 25
   D: 35

5. **EPA regulations require that all appliances containing more than 50 pounds of refrigerant (except for commercial and industrial process refrigeration) be repaired when the leak rate exceeds _____ percent of the charge per year.**

   A: 0
   B: 15
   C: 25
   D: 35

6. **R-11 or R-123 system refrigerant removal starts with;**

   A: vapor removal.
   B: liquid removal.
   C: vapor & liquid removal.
   D: oil separation.

13. **After system servicing, why is refrigerant vapor re-introduced to the refrigeration system before refrigerant liquid?**

A: **Vapor charging increases pressure slowly, preventing failure of the rupture disk.**
B: **Vapor charging is faster than liquid charging.**
C: **Liquid charging is more difficult to control than vapor charging.**
D: **Liquid charged into a deep vacuum will boil and may lower temperatures enough to freeze water in the tubes.**

14. **When using recovery or recycling equipment manufactured BEFORE November 15, 1993, technicians must evacuate low-pressure appliances to the following level before making a major repair:**

A: **0 psig.**
B: **15 inches of Hg vacuum.**
C: **25 inches of Hg vacuum.**
D: **25 mm of Hg absolute.**

15. **Appliances need not be evacuated all the way to the prescribed level when;**

A: **the repair is major.**
B: **the repair is followed by an evacuation of the appliance to the environment.**
C: **leaks in the appliance make evacuation to the prescribed level unattainable.**
D: **the appliance is being disposed.**

16. **After reaching the required recovery vacuum on an appliance, you should;**

A: **immediately disconnect the recycling or recovery equipment and open the system for service.**
B: **wait for at least a few minutes to see if the system pressure rises, indicating that there is still refrigerant in liquid form or in the oil.**
C: **immediately break the vacuum with nitrogen and open the system for service.**
D: **immediately pressurize the system with nitrogen and perform a leak check.**

17. **Which of the following repairs would ALWAYS be considered "major" under EPA's regulations?**

A: **Replacement of an evaporator coil.**
B: **Replacement of a filter-drier.**
C: **Replacement of a switch.**
D: **Replacement of a purge unit.**

18. **When using recovery and recycling equipment manufactured AFTER November 15, 1993, technicians must evacuate low-pressure appliances to the following level before disposing of the appliance:**

A. **0 psig.**
B. **15 inches of Hg vacuum.**
C. **25 inches of Hg vacuum.**
D. **25 mm of Hg absolute.**