SECTION A7 — HEATING AND AIR CONDITIONING PRACTICE EXAMS

The seven full-length simulation exams in Section A7 cover the ASE A7 Heating and Air Conditioning certification. Each exam contains fifty multiple-choice questions delivered in the exact format the live A7 test uses, with the same domain weighting that ASE specifies for the current version of the test:

- **A/C System Diagnosis and Repair** — 14 questions per exam (28 percent)
- **Refrigeration System Component Diagnosis and Repair** — 9 questions per exam (18 percent)
- **Heating, Ventilation, Engine Cooling, and A/C Air Distribution Systems Diagnosis and Repair** — 9 questions per exam (18 percent)
- **Operating Systems and Related Controls Diagnosis and Repair** — 13 questions per exam (26 percent)
- **Refrigerant Recovery, Recycling, Handling, and Retrofit** — 5 questions per exam (10 percent)

A7 is the climate control specialty test that combines mechanical refrigeration knowledge with modern electronic climate control diagnosis. The technician who passes A7 must be deeply skilled in refrigeration theory (pressure-temperature relationships, latent heat, heat transfer, the refrigeration cycle), refrigerant types and handling (R-134a, R-1234yf, and the now-phased-out R-12), refrigerant recovery and recycling procedures (regulated by EPA Section 609), system diagnosis through manifold gauge readings, leak detection methods (electronic, dye, ultrasonic), component diagnosis (compressors, condensers, evaporators, expansion devices, receiver-driers, accumulators), heating system operation including the engine cooling system integration, ventilation system air distribution and door operation, and the complex electronic climate control modules that manage modern HVAC systems.

The defining characteristic of the A7 exam is that **A/C system diagnosis** is the largest single domain at twenty-eight percent. Fourteen questions per exam directly involve A/C diagnosis: pressure-temperature interpretation, manifold gauge reading, system performance verification, identification of common failure modes (low charge, overcharge, restriction, compressor failure, expansion device issues), and the relationship between system pressures and component operation. The technician who masters A/C diagnosis can identify the cause of most performance complaints from gauge readings alone.

A second defining characteristic is that **operating systems and electronic controls** at twenty-six percent reflects the modern integration of HVAC with electronic control systems. Thirteen questions per exam involve electronic climate control modules, sensor inputs (ambient temperature, in-car temperature, evaporator temperature, sun load, humidity), actuator outputs (blend doors, mode doors, recirculation doors, blower motors), CAN bus communication for HVAC, and scan tool diagnosis. Modern A/C systems are no longer simple mechanical refrigeration; they are integrated electronic systems that require scan tool diagnosis.

A third defining characteristic is that **refrigeration component diagnosis** at eighteen percent and **HVAC, engine cooling, and air distribution diagnosis** at eighteen percent provide the foundational system knowledge. Each domain contributes nine questions per exam covering the specific components and subsystems. The technician must understand compressor types and operation, condenser and evaporator function, expansion devices (orifice tube vs. thermal expansion valve), receiver-driers and accumulators, heater core operation, engine cooling integration with HVAC, blower motor and resistor circuits, blend door and mode door operation, and ventilation system airflow.

A fourth defining characteristic is that **refrigerant handling, recovery, and retrofit** at ten percent is regulatory test content. Five questions per exam involve EPA Section 609 requirements, refrigerant identification and verification, recovery and recycling procedures, retrofit considerations from R-12 to R-134a (and now R-134a to R-1234yf), proper refrigerant disposal, and the regulatory framework around refrigerant handling. The A7-certified technician must understand both the mechanical and regulatory aspects of refrigerant work.

A fifth defining characteristic is that **R-1234yf refrigerant** has become standard test content. Modern vehicles use R-1234yf rather than R-134a; the technician must understand the differences (lower GWP, mild flammability classification, specific equipment requirements, identification protocols) and the proper service procedures specific to R-1234yf. Questions on this refrigerant appear regularly across multiple A7 domains.

A sixth defining characteristic is that **engine cooling system integration** with HVAC is essential A7 content. The heater core depends on engine coolant flow; engine cooling system issues affect heating performance. Engine cooling fan operation affects A/C condenser cooling; cooling system failures affect A/C performance. The A7-certified technician must understand both systems and how they interact.

The exams in this section progress from foundational refrigeration knowledge in early exams to integrated multi-domain scenarios in later exams. Early exams focus on individual systems — refrigeration cycle, component diagnosis, leak detection, ventilation operation. Middle exams introduce comparative diagnosis and the integration with electronic controls. Later exams concentrate on complex scenarios where refrigeration, electronic, and engine cooling systems all interact.

Total practice questions in Section A7: **350 questions** across 7 simulation exams.

Set a timer for ninety minutes when taking each exam, work through the questions without referencing notes, and resist the temptation to peek at the answer key until you have submitted your final answer for every question. Treat each simulation as if it were the live A7 test waiting for you at a Prometric testing center. Pay particular attention to A/C diagnosis questions and electronic control content — these are the areas where strong A7 candidates separate themselves from those who lack foundational refrigeration knowledge or who struggle with modern electronic climate control diagnosis.

PRACTICE EXAM 1: A7 SIMULATION — HEATING AND AIR CONDITIONING

1. A vehicle has been brought in with a complaint of inadequate cooling from the A/C system. The MOST appropriate first diagnostic step is to:

A. Verify the concern, perform a performance test, and connect manifold gauges

B. Replace the compressor as a precaution

C. Replace the refrigerant as the only step

D. Apply compressed air to the system

2. The proper procedure for connecting manifold gauges to a vehicle's A/C system is to:

A. Apply compressed air to the system

B. Replace the gauges as a precaution

C. Visually inspect for visible damage only

D. Connect low-side hose to low-pressure port and high-side hose to high-pressure port

3. A vehicle's A/C manifold gauge readings show low low-side and low high-side pressures with the system commanded on. The MOST likely cause is:

A. A worn power steering pulley

B. Low refrigerant charge in the system

C. A worn ball joint

D. Air in the clutch hydraulic system

4. The proper procedure for diagnosing low refrigerant charge is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Replace the compressor as a precaution

D. Recover refrigerant, weigh recovered amount, identify leaks, repair, and recharge to specification

5. A vehicle has been brought in with a complaint of inadequate cooling. Manifold gauges show high low-side and high high-side pressures. The MOST likely cause is:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Overcharged system, restricted condenser airflow, or condenser cooling issue

D. Replace the brake fluid as the only step

6. The proper procedure for diagnosing high system pressures is to:

A. Apply compressed air to the system

B. Verify proper charge, inspect airflow, verify condenser cooling, and identify the cause

C. Replace the refrigerant as a precaution

D. Visually inspect for visible damage only

7. A vehicle has been brought in with a complaint of A/C cooling that stops after a few minutes. Manifold gauges show normal initial readings, then high pressure builds. The MOST likely cause is:

A. A failed cooling fan affecting condenser cooling, or restricted condenser airflow

B. Apply compressed air to the system

C. Replace the refrigerant as a precaution

D. Replace the brake fluid as the only step

8. The proper procedure for diagnosing intermittent A/C performance is to:

A. Apply compressed air to the system

B. Replace the compressor as a precaution

C. Replace the refrigerant as a precaution

D. Verify the concern, monitor pressures during operation, observe condenser cooling

9. A vehicle has been brought in with a complaint that the A/C compressor does not engage. The MOST appropriate diagnostic action is to:

A. Apply compressed air to the system

B. Replace the compressor as a precaution

C. Verify proper charge, verify clutch power and ground, verify protection mode status

D. Replace the brake fluid as the only step

10. The proper procedure for testing an A/C compressor clutch is to:

A. Apply compressed air to the clutch

B. Verify proper voltage at the coil, verify ground path, and verify the clutch engages

C. Replace the clutch as a precaution

D. Visually inspect for visible damage only

11. A vehicle equipped with a variable displacement compressor has been brought in for diagnosis. The proper purpose of a variable displacement compressor is to:

A. Adjust compressor output to match cooling demand without cycling

B. Apply compressed air to the system

C. Replace the compressor as a precaution

D. Filter contaminants from the system

12. The proper procedure for diagnosing variable displacement compressor operation is to:

A. Apply compressed air to the compressor

B. Replace the compressor as the most direct repair

C. Replace the refrigerant as the only step

D. Verify the concern, retrieve DTCs, monitor displacement control, and verify operation

13. A vehicle has been brought in with a complaint of refrigerant odor from the vents. The MOST likely cause is:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. A refrigerant leak inside the evaporator core

D. Replace the brake fluid as the only step

14. The proper procedure for performing electronic refrigerant leak detection is to:

A. Apply compressed air to the system

B. Use an electronic detector calibrated for the refrigerant and identify any leaks

C. Replace the refrigerant as a precaution

D. Visually inspect for visible damage only

15. A vehicle's A/C system has been diagnosed with a refrigerant leak. The proper procedure for identifying the specific leak location is to:

A. Use multiple methods (electronic detector, dye, visual) to identify the leak point

B. Apply compressed air to the system

C. Replace the refrigerant as a precaution

D. Replace the affected components as a precaution

16. The proper procedure for using refrigerant dye to detect leaks is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Replace the compressor as a precaution

D. Add the specified dye, operate the A/C, and use UV light to inspect for traces

17. A vehicle equipped with R-134a refrigerant has been brought in for service. The proper procedure for refrigerant identification is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Use a refrigerant identifier to verify the type and purity before service

D. Visually inspect for visible damage only

18. The proper purpose of a refrigerant identifier is to:

A. Apply compressed air to the system

B. Verify the refrigerant type and detect contamination from improper service

C. Replace the refrigerant as a precaution

D. Filter contaminants from the system

19. A vehicle equipped with R-1234yf refrigerant has been brought in for service. The proper procedure for R-1234yf service is to:

A. Use only R-1234yf-rated equipment, follow the manufacturer's procedure, verify identification

B. Apply compressed air to the system

C. Replace with R-134a as a precaution

D. Replace the brake fluid as the only step

20. The proper procedure for refrigerant recovery is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Replace the compressor as a precaution

D. Use an EPA-certified recovery machine and verify full evacuation before service

21. A vehicle's A/C system has been evacuated. The proper procedure for evacuation is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Operate the vacuum pump per spec, verify vacuum holds, and verify the system is leak-free

D. Visually inspect for visible damage only

22. The proper procedure for charging an A/C system is to:

A. Apply compressed air to the system

B. Use an RRR machine to charge the specified amount by weight, verify performance

C. Replace the refrigerant as a precaution

D. Replace the compressor as a precaution

23. A vehicle's A/C system has been brought in for retrofit from R-12 to R-134a. The proper procedure for retrofit is to:

A. Apply compressed air to the system

B. Replace the refrigerant as a precaution

C. Replace the compressor as a precaution

D. Replace incompatible parts, change oil, install retrofit fittings, evacuate, recharge, verify

24. The proper purpose of EPA Section 609 certification is to:

A. Authorize technicians to perform refrigerant service legally

B. Apply compressed air to the system

C. Replace the certification as a precaution

D. Filter contaminants from the system

25. A vehicle's A/C condenser has been damaged. The MOST likely cause of system failure is:

A. Apply compressed air to the system

B. Replace the condenser as a precaution

C. Reduced heat transfer and potential refrigerant leakage from the damaged area

D. Replace the brake fluid as the only step

26. The proper purpose of the A/C condenser is to:

A. Apply compressed air to the system

B. Transfer heat from the high-pressure refrigerant vapor to ambient air, condensing it to liquid

C. Replace the condenser as a precaution

D. Filter contaminants from the system

27. A vehicle's A/C evaporator has been brought in with a complaint of musty odor from the vents. The MOST likely cause is:

A. Apply compressed air to the evaporator

B. Replace the evaporator as a precaution

C. Replace the refrigerant as a precaution

D. Microbial growth on the evaporator surface from condensation

28. The proper purpose of the A/C evaporator is to:

A. Absorb heat from cabin air as the refrigerant evaporates, cooling the air

B. Apply compressed air to the system

C. Replace the evaporator as a precaution

D. Filter contaminants from the system

29. A vehicle equipped with an orifice tube has been brought in for service. The proper purpose of the orifice tube is to:

A. Apply compressed air to the tube

B. Replace the tube as a precaution

C. Provide a fixed restriction that meters refrigerant flow into the evaporator

D. Filter contaminants from the system

30. A vehicle equipped with a thermal expansion valve (TXV) has been brought in for service. The proper purpose of the TXV is to:

A. Apply compressed air to the valve

B. Provide variable refrigerant metering based on evaporator temperature

C. Replace the valve as a precaution

D. Filter contaminants from the system

31. The proper procedure for diagnosing a restricted orifice tube is to:

A. Apply compressed air to the tube

B. Replace the tube as a precaution

C. Replace the refrigerant as a precaution

D. Verify pressures, observe temperature change at the orifice, and inspect the orifice condition

32. A vehicle equipped with a receiver-drier has been brought in for service. The proper purpose of the receiver-drier is to:

A. Store excess liquid refrigerant, filter contaminants, and absorb moisture

B. Apply compressed air to the system

C. Replace the receiver-drier as a precaution

D. Filter contaminants from the brake fluid

33. A vehicle equipped with an accumulator has been brought in for service. The proper purpose of the accumulator is to:

A. Apply compressed air to the system

B. Replace the accumulator as a precaution

C. Store liquid refrigerant after the evaporator, filter contaminants, and absorb moisture

D. Filter contaminants from the brake fluid

34. The proper procedure for replacing a receiver-drier or accumulator is to:

A. Apply compressed air to the component

B. Recover refrigerant, replace the component, evacuate, recharge, and verify operation

C. Replace only the refrigerant as a precaution

D. Visually inspect for visible damage only

35. A vehicle has been brought in with a complaint that the heater does not produce adequate heat. The MOST likely cause is:

A. Apply compressed air to the heating system

B. Replace the heater core as a precaution

C. Replace the refrigerant as a precaution

D. Low coolant level, restricted heater core, faulty thermostat, or heater control fault

36. The proper procedure for diagnosing inadequate heating is to:

A. Apply compressed air to the system

B. Replace the heater core as a precaution

C. Verify coolant level, verify coolant flow, verify thermostat, verify heater controls

D. Replace the refrigerant as a precaution

37. A vehicle has been brought in with a complaint of coolant leak from the heater core. The MOST appropriate action is:

A. Replace the heater core, refill coolant, bleed the system, and verify operation

B. Apply compressed air to the heater core

C. Replace the refrigerant as a precaution

D. Replace the brake fluid as the only step

38. The proper purpose of the heater core is to:

A. Apply compressed air to the system

B. Transfer heat from engine coolant to cabin air for heating

C. Replace the heater core as a precaution

D. Filter contaminants from the system

39. A vehicle's engine cooling fan has been brought in for diagnosis. The proper purpose of the engine cooling fan in HVAC operation is to:

A. Apply compressed air to the fan

B. Replace the fan as a precaution

C. Replace the refrigerant as a precaution

D. Provide airflow through the condenser and radiator for both engine and A/C cooling

40. The proper procedure for diagnosing engine cooling fan operation is to:

A. Apply compressed air to the fan

B. Replace the fan as a precaution

C. Verify proper fan operation at varied conditions, monitor commanded speed, verify operation

D. Replace the refrigerant as a precaution

41. A vehicle has been brought in with a complaint that the blower motor does not function. The MOST likely cause is:

A. A failed motor, fault in the resistor or controller, or fault in the HVAC control

B. Apply compressed air to the motor

C. Replace the blower motor as a precaution

D. Replace the brake fluid as the only step

42. The proper procedure for diagnosing blower motor faults is to:

A. Apply compressed air to the motor

B. Verify the concern, check power and ground, verify resistor or controller operation

C. Replace the blower motor as a precaution

D. Replace the brake fluid as the only step

43. A vehicle has been brought in with a complaint that the blower motor only works at high speed. The MOST likely cause is:

A. Apply compressed air to the system

B. Replace the blower motor as a precaution

C. Replace the refrigerant as a precaution

D. A failed blower motor resistor or speed controller

44. The proper procedure for replacing a blower motor resistor is to:

A. Apply compressed air to the resistor

B. Replace the resistor as a precaution

C. Replace the worn resistor, verify proper installation, and verify all blower speeds

D. Replace the refrigerant as the only step

45. A vehicle has been brought in with a complaint of incorrect air discharge (defrost when face is selected, or vice versa). The MOST likely cause is:

A. Apply compressed air to the system

B. A failed mode door actuator, fault in the wiring, or fault in the HVAC control

C. Replace the HVAC control module as a precaution

D. Replace the brake fluid as the only step

46. The proper procedure for diagnosing mode door actuator faults is to:

A. Verify the concern, retrieve DTCs, command actuator operation, and verify operation

B. Apply compressed air to the system

C. Replace the actuator as a precaution

D. Replace the brake fluid as the only step

47. A vehicle has been brought in with a complaint that air does not change temperature when the temperature control is adjusted. The MOST likely cause is:

A. Apply compressed air to the system

B. Replace the HVAC control module as a precaution

C. Replace the refrigerant as a precaution

D. A failed blend door actuator, fault in the wiring, or fault in the HVAC control

48. The proper procedure for diagnosing blend door actuator faults is to:

A. Apply compressed air to the system

B. Verify the concern, retrieve DTCs, command actuator operation, and verify operation

C. Replace the actuator as a precaution

D. Replace the brake fluid as the only step

49. A vehicle equipped with electronic automatic temperature control (EATC) has been brought in with a complaint of incorrect cabin temperature control. The MOST likely cause is:

A. Apply compressed air to the system

B. Replace the EATC module as a precaution

C. A failed sensor (in-car, ambient, sun load, or evaporator temp), or EATC module fault

D. Replace the brake fluid as the only step

50. The proper procedure for diagnosing EATC system faults is to:

A. Verify the concern, retrieve DTCs, monitor sensor inputs and actuator commands

B. Apply compressed air to the system

C. Replace the EATC module as a precaution

D. Replace the brake fluid as the only step

PRACTICE EXAM 1: A7 SIMULATION — ANSWER KEY, EXPLANATIONS, AND TASK REMEDIATION

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1. A — Verify the concern, perform a performance test, and connect manifold gauges. A/C diagnosis begins with concern verification and baseline measurement. Performance testing and gauge readings together reveal the system's operational state before component replacement. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*
2. D — Connect low-side hose to low-pressure port and high-side hose to high-pressure port. Manifold gauge connection follows the system's pressure design. The low and high sides are separated for proper pressure measurement and to prevent cross-contamination of readings. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*
3. B — Low refrigerant charge in the system. Both low low-side and low high-side pressures are the diagnostic signature of insufficient refrigerant. Without enough refrigerant, the system cannot develop proper operating pressures on either side. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*
4. D — Recover refrigerant, weigh recovered amount, identify leaks, repair, and recharge to specification. Low charge diagnosis requires recovery for accurate measurement and leak identification. Without addressing the leak, recharging only delays the recurring issue. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*
5. C — Overcharged system, restricted condenser airflow, or condenser cooling issue. Both high low-side and high high-side pressures indicate the system cannot dissipate heat properly. Overcharge or condenser airflow issues each produce this gauge signature. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*
6. B — Verify proper charge, inspect airflow, verify condenser cooling, and identify the cause. High pressure diagnosis requires systematic verification of multiple potential causes. Each step isolates a different aspect of the heat rejection process. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*
7. A — A failed cooling fan affecting condenser cooling, or restricted condenser airflow. Pressure that builds during operation indicates progressive heat accumulation in the condenser. Fan failure

or airflow restriction prevents proper heat rejection over time. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

8. D — Verify the concern, monitor pressures during operation, observe condenser cooling. Intermittent A/C diagnosis requires capturing the symptom during operation. Pressure monitoring and condenser observation together reveal the cause. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

9. C — Verify proper charge, verify clutch power and ground, verify protection mode status. Compressor non-engagement diagnosis requires checking refrigerant level (low-pressure cutoff), electrical supply, and system protection logic. Each prevents engagement when out of specification. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

10. B — Verify proper voltage at the coil, verify ground path, and verify the clutch engages. A/C clutch testing requires electrical verification at the coil plus mechanical verification of engagement. Both must function for proper compressor operation. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

11. A — Adjust compressor output to match cooling demand without cycling. Variable displacement compressors modulate output to demand rather than cycling on and off. This provides smoother operation and improved efficiency compared to fixed displacement. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

12. D — Verify the concern, retrieve DTCs, monitor displacement control, and verify operation. Variable displacement compressor diagnosis requires scan tool integration to monitor the control commands and feedback. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

13. C — A refrigerant leak inside the evaporator core. Refrigerant odor at the vents is the diagnostic signature of evaporator core leakage. The refrigerant escapes into the airflow path and is delivered to the cabin. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

14. B — Use an electronic detector calibrated for the refrigerant and identify any leaks. Electronic leak detection requires a detector matched to the specific refrigerant. R-134a and R-1234yf require different detector types or settings. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

15. A — Use multiple methods (electronic detector, dye, visual) to identify the leak point. Refrigerant leak isolation often requires multiple detection methods. Each method has different sensitivities and reveals different leak types. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

16. D — Add the specified dye, operate the A/C, and use UV light to inspect for traces. Dye detection requires the manufacturer-specified dye amount, system operation to circulate the dye, and UV inspection. The dye reveals leak locations through fluorescent traces. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

17. C — Use a refrigerant identifier to verify the type and purity before service. Refrigerant identification protects equipment and ensures proper service. Contaminated or mixed refrigerants damage recovery equipment and produce poor performance. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

18. B — Verify the refrigerant type and detect contamination from improper service. The identifier protects technicians and equipment from contaminated refrigerant. Contamination from mixing or improper service can produce dangerous conditions and equipment damage. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

19. A — Use only R-1234yf-rated equipment, follow the manufacturer's procedure, verify identification. R-1234yf service requires equipment specifically rated for it due to mild flammability classification. Standard R-134a equipment cannot safely handle R-1234yf. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

20. D — Use an EPA-certified recovery machine and verify full evacuation before service. Recovery is regulated by EPA Section 609. Certified equipment ensures proper recovery without venting refrigerant to atmosphere; verification confirms complete recovery. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

21. C — Operate the vacuum pump per spec, verify vacuum holds, and verify the system is leak-free. Evacuation removes air and moisture from the system. Vacuum hold verification confirms the system is sealed before refrigerant is added. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

22. B — Use an RRR machine to charge the specified amount by weight, verify performance. Charging by weight ensures the manufacturer-specified amount. Performance verification confirms the charge is correct and the system operates properly. *ASE Task Reference: A7 Domain A — A/C System Diagnosis and Repair. Review subsection 7.1.*

23. D — Replace incompatible parts, change oil, install retrofit fittings, evacuate, recharge, verify. R-12 to R-134a retrofit requires multiple steps because the refrigerants and oils are incompatible. Each step is required for proper conversion. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

24. A — Authorize technicians to perform refrigerant service legally. EPA Section 609 certification is legally required for refrigerant work. The certification ensures technicians understand proper

handling and regulatory requirements. *ASE Task Reference: A7 Domain E — Refrigerant Recovery, Recycling, Handling, and Retrofit. Review subsection 7.5.*

25. C — Reduced heat transfer and potential refrigerant leakage from the damaged area. Damaged condensers cannot dissipate heat properly and may leak refrigerant. Both effects compromise system operation and require repair. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

26. B — Transfer heat from the high-pressure refrigerant vapor to ambient air, condensing it to liquid. The condenser is the heat rejection component of the refrigeration cycle. The phase change from vapor to liquid releases heat to the ambient air. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

27. D — Microbial growth on the evaporator surface from condensation. Musty odor at the vents is the diagnostic signature of microbial growth. The cold, moist evaporator provides ideal conditions for microorganism development. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

28. A — Absorb heat from cabin air as the refrigerant evaporates, cooling the air. The evaporator is the heat absorption component. The phase change from liquid to vapor absorbs heat from cabin air, producing the cooling effect. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

29. C — Provide a fixed restriction that meters refrigerant flow into the evaporator. The orifice tube is a simple, fixed-orifice metering device. It provides constant restriction without active control like a TXV. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

30. B — Provide variable refrigerant metering based on evaporator temperature. The TXV adjusts metering based on evaporator outlet temperature, optimizing system performance under varied conditions. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

31. D — Verify pressures, observe temperature change at the orifice, and inspect the orifice condition. Restricted orifice diagnosis requires pressure analysis, temperature observation, and physical inspection. Each method reveals different aspects. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

32. A — Store excess liquid refrigerant, filter contaminants, and absorb moisture. The receiver-drier serves multiple functions in TXV systems. It supports proper operation and protects the system from contamination. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

33. C — Store liquid refrigerant after the evaporator, filter contaminants, and absorb moisture. The accumulator serves similar functions in orifice tube systems but is located after the evaporator

rather than after the condenser. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

34. B — Recover refrigerant, replace the component, evacuate, recharge, and verify operation. Receiver-drier or accumulator replacement requires complete system service. Each step ensures proper post-service operation. *ASE Task Reference: A7 Domain B — Refrigeration System Component Diagnosis and Repair. Review subsection 7.2.*

35. D — Low coolant level, restricted heater core, faulty thermostat, or heater control fault. Inadequate heating has multiple potential causes related to coolant flow and heater operation. Each cause prevents proper heat transfer. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

36. C — Verify coolant level, verify coolant flow, verify thermostat, verify heater controls. Heating diagnosis requires systematic verification of multiple components. Each step provides different diagnostic information. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

37. A — Replace the heater core, refill coolant, bleed the system, and verify operation. Heater core leaks require replacement; the core cannot be reliably repaired. Bleeding ensures complete coolant fill after replacement. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

38. B — Transfer heat from engine coolant to cabin air for heating. The heater core uses engine coolant heat to warm cabin air. The integration with engine cooling provides efficient heating. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

39. D — Provide airflow through the condenser and radiator for both engine and A/C cooling. The cooling fan supports both systems. The fan must function for proper engine cooling and proper A/C condenser cooling. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

40. C — Verify proper fan operation at varied conditions, monitor commanded speed, verify operation. Cooling fan diagnosis requires verification across operating conditions. Modern variable-speed fans require scan tool monitoring. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

41. A — A failed motor, fault in the resistor or controller, or fault in the HVAC control. Blower motor non-operation has multiple potential causes. Each component contributes to motor function. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

42. B — Verify the concern, check power and ground, verify resistor or controller operation. Blower motor diagnosis requires systematic verification of electrical components. Each step provides

different diagnostic information. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

43. D — A failed blower motor resistor or speed controller. Blower working only on high speed is the diagnostic signature of resistor failure. High speed bypasses the resistor; lower speeds depend on it. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

44. C — Replace the worn resistor, verify proper installation, and verify all blower speeds. Resistor replacement requires installation verification and operation verification across all speeds. *ASE Task Reference: A7 Domain C — Heating, Ventilation, Engine Cooling, and A/C Air Distribution. Review subsection 7.3.*

45. B — A failed mode door actuator, fault in the wiring, or fault in the HVAC control. Incorrect air discharge indicates the mode door is not in the commanded position. Actuator, wiring, or control faults each prevent proper positioning. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*

46. A — Verify the concern, retrieve DTCs, command actuator operation, and verify operation. Mode door actuator diagnosis requires scan tool integration to command and verify operation. Each step provides different diagnostic information. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*

47. D — A failed blend door actuator, fault in the wiring, or fault in the HVAC control. Temperature not changing indicates the blend door is not responding. Each cause prevents proper blend door positioning. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*

48. B — Verify the concern, retrieve DTCs, command actuator operation, and verify operation. Blend door diagnosis requires the same systematic approach as mode door diagnosis. Scan tool integration is essential. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*

49. C — A failed sensor (in-car, ambient, sun load, or evaporator temp), or EATC module fault. EATC depends on multiple sensor inputs. Sensor failure or module fault prevents proper temperature control. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*

50. A — Verify the concern, retrieve DTCs, monitor sensor inputs and actuator commands. EATC diagnosis requires comprehensive scan tool integration. Each input and output must be evaluated for proper function. *ASE Task Reference: A7 Domain D — Operating Systems and Related Controls. Review subsection 7.4.*