

PRACTICE EXAM 9: ASE A7 SIMULATION (50 QUESTIONS)

1. A technician performs a cooling system pressure test on a vehicle with a heating complaint. The system holds 16 psi for 20 minutes with no pressure drop. The engine reaches 200°F operating temperature. The heater supply hose at the firewall measures 198°F with an infrared thermometer, and the return hose measures 115°F. What do these temperature readings indicate?

- A. Normal heater core operation with an expected temperature differential between inlet and outlet hoses
- B. A partially restricted heater core that is not passing adequate coolant flow despite adequate inlet temperature
- C. A failed water pump that cannot push enough coolant volume through the narrow heater core passages
- D. An oversized heater core replacement that has too much internal volume for the engine's coolant capacity

2. A technician removes a compressor from a vehicle after a noise complaint. During disassembly inspection, the technician finds that two of the five reed valves on the discharge valve plate are cracked and one is broken completely with a missing fragment. What must the technician do in addition to installing a new compressor?

- A. Replace the serpentine belt and tensioner since reed valve fragments may have scored the pulley surfaces
- B. Flush only the discharge line and condenser since debris travels downstream from the compressor discharge
- C. Simply install the new compressor with fresh oil since the missing fragment is too small to cause damage
- D. Flush the system, replace the metering device and accumulator/receiver-drier, and inspect all screens for debris

3. A vehicle's A/C system produces a vent temperature of 44°F at 82°F ambient. The customer states the system "used to blow colder." The technician measures superheat at 10°F and subcooling at 14°F. Gauge pressures are within normal range. What should the technician conclude?

- A. The TXV is beginning to restrict and should be replaced to restore maximum evaporator performance
- B. The condenser needs cleaning because the subcooling of 14°F indicates marginal heat rejection capacity
- C. The system is operating within normal specifications and the customer's expectation may not match the system's capability
- D. The compressor is losing efficiency internally, producing adequate but declining cooling that will worsen over time

4. A vehicle's scan tool shows the HVAC module commanding the blend door to 0% (full cold). The actual position feedback reads 0%. The evaporator temperature sensor reads 36°F. The vent temperature measured by the technician is 78°F. What is the MOST likely cause?

- A. A heater control valve stuck in the open position allowing hot coolant to heat the air despite the cold door position
- B. A faulty evaporator temperature sensor reading much colder than actual and limiting compressor operation
- C. A disconnected blend door where the actuator shaft has separated from the door inside the HVAC housing
- D. An incorrectly calibrated blend door actuator where the module's 0% does not correspond to the door's full cold stop

5. Technician A says that the R-134a charge specification for a vehicle with rear auxiliary A/C is always exactly double the charge for the same vehicle without rear A/C. Technician B says that the rear auxiliary system adds additional refrigerant volume from the rear evaporator, expansion device, and extended refrigerant lines. Who is correct?

- A. Technician A only, because manufacturers consistently double the charge for rear-equipped vehicles
- B. Technician B only, because the additional charge varies by system design and is not always exactly double
- C. Both Technician A and Technician B, because doubling is the standard formula used across all manufacturers
- D. Neither Technician A nor Technician B, because rear systems use a completely separate refrigerant charge

6. On a vehicle with electronic HVAC controls, the technician retrieves DTC U0073 — Control Module Communication Bus Off. The scan tool cannot communicate with any module on the vehicle. What is the MOST likely cause?

- A. Multiple individual module failures across all vehicle systems occurring simultaneously from a voltage spike
- B. A failed scan tool data link connector adapter that is preventing the tool from establishing communication
- C. The HVAC control module has failed and is flooding the CAN bus with corrupted data blocking all traffic
- D. A CAN bus wiring fault such as a short, open, or missing termination resistor that has disabled the entire network

7. Technician A says that a scroll compressor has fewer moving parts than a reciprocating piston compressor. Technician B says that scroll compressors are typically more tolerant of brief exposure to small amounts of liquid refrigerant than reciprocating designs. Who is correct?

- A. Both Technician A and Technician B are correct about scroll compressor design advantages
- B. Technician A only, because scroll compressors are equally vulnerable to liquid slugging as piston types
- C. Technician B only, because scroll and reciprocating compressors have the same number of moving parts

D. Neither Technician A nor Technician B, because scroll compressors are less durable than piston designs

8. A vehicle owner reports that when they use the heater on rainy days, the inside of the windshield fogs heavily even with the defrost mode selected. The A/C compressor is confirmed to engage in defrost mode. The evaporator temperature is 37°F and the system cools normally. What should the technician check?

A. The condenser fan operation since reduced condenser efficiency can affect the evaporator's dehumidification

B. The refrigerant charge since a marginal undercharge would reduce the evaporator's moisture removal capacity

C. Whether the air inlet door is stuck in the recirculation position, preventing fresh air from entering the system

D. The heater core for a slow leak that is releasing moisture-laden coolant vapor into the defrost airstream

9. A vehicle's A/C system has been properly charged. The technician performs a performance test and finds the following at 88°F ambient: low side 35 psi, high side 220 psi, vent temperature 46°F, subcooling 16°F, superheat 11°F. The condenser inlet measures 172°F and the outlet measures 104°F. What can the technician determine from these readings?

A. The condenser is restricted because the 68°F temperature drop across it exceeds the normal 20–50°F range

B. The system is significantly overcharged because the subcooling of 16°F exceeds the maximum acceptable value

C. The TXV is stuck partially open because the superheat of 11°F is at the upper limit of the acceptable range

D. The system is operating within normal parameters across all measured values for the stated ambient conditions

10. A technician is evacuating a system that was open for a heater hose replacement near the firewall. The A/C system was not intentionally opened, but one of the refrigerant lines near the heater hose may have been slightly disturbed. After 45 minutes of evacuation, the micron gauge reads 1,200 microns and has stabilized at that level. What should the technician do?

- A. Proceed with charging because 1,200 microns is acceptable for a system that was only briefly disturbed
- B. Continue evacuating, as the stabilized reading suggests residual moisture that needs more time to boil off
- C. Stop evacuation and leak test the system because the inability to reach 500 microns indicates a leak exists
- D. Replace the vacuum pump because a reading of 1,200 microns indicates the pump cannot pull a deeper vacuum

11. A vehicle with ATC has the following scan tool data: set temperature 72°F, in-car sensor 72°F, ambient sensor 85°F, sun load sensor 4.2V, evaporator temp 36°F, compressor ON, blend door at 20%. The customer reports the system maintains temperature correctly but the cabin feels excessively dry. What is the MOST likely explanation?

- A. Normal A/C operation — the evaporator removes humidity as a byproduct of cooling, which some occupants notice
- B. The TXV is stuck open, causing the evaporator to run colder than necessary and removing excess moisture
- C. The sun load sensor reading of 4.2V is too high, commanding excessive cooling that over-dehumidifies the air
- D. The recirculation door is stuck open, continuously recirculating already-dry air and reducing humidity further

12. A vehicle's condenser has been replaced after a front-end collision. The new condenser is a parallel flow design. After proper evacuation and charging, the system cools well but the technician notices a faint whistling noise from the condenser area that was not present before the collision. What is the MOST likely cause?

- A. The new condenser has a slightly different internal flow pattern that creates turbulence noise under pressure
- B. A loose mounting bracket or misaligned condenser seal allowing air to whistle through a gap during driving
- C. Refrigerant flow noise through the new condenser's micro-channels, which is normal for parallel flow designs and may differ from the original
- D. An internal restriction in the new condenser caused by manufacturing debris that was not flushed before installation

13. A technician is diagnosing a vehicle where the compressor clutch engages when jumping the relay socket terminals 30 and 87, but does not engage during normal A/C operation. The scan tool shows the HVAC module is commanding the relay ON. What component in the circuit between the module and the clutch is MOST likely at fault?

- A. The compressor clutch coil, since it engages when bypassed but may have intermittent high resistance
- B. The A/C clutch relay itself, since the module commands it but the relay is not closing its internal contacts
- C. The low-pressure cutout switch, which is open due to a low charge and is in series between the relay and clutch
- D. The HVAC control module's relay driver circuit, which is sending the command but not providing adequate ground

14. A vehicle's cooling fan runs at high speed continuously from the moment the engine starts, even when the engine is cold and the A/C is off. The scan tool shows the engine coolant temperature sensor reading 280°F. The technician's infrared thermometer on the coolant housing reads 120°F (engine just started). What is the MOST likely cause?

- A. A failed cooling fan relay that has welded contacts and is bypassing the normal control circuit entirely

- B. A faulty engine management system that is commanding high fan speed regardless of temperature input
- C. A stuck-closed thermostat causing the engine to overheat rapidly and triggering the high-speed fan response
- D. A faulty coolant temperature sensor sending an extremely high false reading that triggers the fan high-speed logic

15. A vehicle's A/C system uses R-1234yf. The technician needs to add oil during a compressor replacement. The compressor manufacturer specifies PAG YF oil. The shop has standard R-134a PAG 46 oil on hand. Can this oil be used?

- A. No — standard R-134a PAG oil is not formulated for R-1234yf and may be incompatible with the refrigerant and system seals
- B. Yes — PAG 46 is a universal PAG oil that is compatible with all automotive refrigerants including R-1234yf
- C. No — R-1234yf systems require mineral oil because the HFO refrigerant is incompatible with synthetic oils
- D. Yes — as long as the viscosity matches the specification, any PAG oil can be used in any refrigerant system

16. On a vehicle with vacuum-controlled HVAC, the technician connects a hand vacuum pump to the mode door actuator. When 15 inches of vacuum is applied, the actuator pulls the door to the correct position. After the pump is disconnected, the vacuum holds steady for 30 seconds, then slowly bleeds down to zero over the next 3 minutes, and the door gradually returns to its default position. What does this indicate?

- A. Normal actuator operation, as all vacuum actuators slowly bleed off vacuum over time due to inherent porosity
- B. The actuator diaphragm is intact but the actuator body has a small air leak at a seam or fitting connection
- C. The actuator diaphragm has a slow leak that cannot hold vacuum and the actuator must be replaced

D. The vacuum supply hose to the actuator has a pinhole leak that allows vacuum to escape during normal use

17. A vehicle has a TXV system with a receiver-drier that includes a sight glass. The system is properly charged with R-134a. During operation at 85°F ambient, the sight glass shows occasional small bubbles passing through intermittently. The vent temperature is 42°F and gauge pressures are within normal range. What should the technician conclude?

A. The system needs an additional 2–3 ounces of refrigerant to eliminate the bubbles in the sight glass

B. Occasional bubbles in the sight glass are normal for R-134a systems and do not indicate a charge problem

C. The receiver-drier desiccant has saturated and is releasing gas bubbles into the liquid refrigerant stream

D. The condenser is not fully condensing the refrigerant, allowing vapor to reach the receiver-drier sight glass

18. A vehicle's heater core was replaced six months ago. The customer returns complaining that the new heater core is already producing less heat than when first installed. The coolant is the correct type and at the proper concentration. Both heater hoses are hot. What is the MOST likely cause?

A. The coolant in the reservoir appears clean, but the system was not flushed before the heater core installation

B. The new heater core has a manufacturing defect with undersized tubes that restricts flow after thermal cycling

C. The blend door actuator has drifted from its calibration and is no longer reaching full hot position

D. Residual contamination from the old cooling system has begun depositing in the new heater core and restricting flow

19. A technician is diagnosing a vehicle where the A/C compressor clutch engages and disengages rapidly — approximately every 2 seconds. The system was recently recharged at another facility. The

manifold gauges show the low side oscillating between 15 psi and 40 psi. The high side oscillates between 125 psi and 220 psi. What is the MOST likely cause?

- A. A refrigerant overcharge causing the system to cycle between flooded and starved conditions through the metering device
- B. A failed cycling clutch pressure switch with contact bounce that is rapidly making and breaking the circuit
- C. An intermittent electrical fault in the clutch coil wiring that causes the magnetic field to collapse repeatedly
- D. A restricted condenser that cannot handle the refrigerant flow at full compressor output and creates back-pressure

20. A vehicle's scan tool shows the evaporator temperature sensor reading 55°F during A/C operation. The technician's probe thermometer at the evaporator outlet reads 38°F. The customer complains that the A/C does not cool as well as expected. What is the MOST likely cause of the poor cooling?

- A. The evaporator is partially iced over, causing an inaccurate reading from the surface-mounted sensor
- B. The compressor is running at reduced displacement due to a control valve fault limiting its output
- C. The sensor reading 55°F (warmer than actual) causes the module to allow more cooling, which should improve performance
- D. The evaporator temperature sensor is malfunctioning and should be replaced to restore proper module control

21. A vehicle with electronic HVAC controls has a blend door actuator that makes a continuous buzzing noise. The scan tool shows the blend door commanded to 45% and the actual position reads 44%. The system maintains temperature correctly. What is the MOST likely cause of the buzzing?

- A. A normal condition where the actuator motor continuously hunts between adjacent positions to maintain precision

- B. A failing actuator motor that is drawing excessive current and producing electromagnetic vibration noise
- C. The blend door is physically binding at the 44–45% position causing the motor to strain against resistance
- D. The actuator motor is continuously running to hold the commanded position against a door that is trying to drift

22. A vehicle's condenser was damaged in a parking lot incident. Only the top two rows of tubes on the parallel flow condenser are visibly crushed. The remaining lower portion of the condenser appears undamaged. Can the system operate with this limited damage?

- A. The system will likely still cool but with reduced efficiency because the damaged section cannot condense refrigerant
- B. The system cannot operate at all because any condenser tube damage causes a complete loss of refrigerant
- C. The system will work normally because the undamaged lower section compensates by increasing flow velocity
- D. The system will overcool because the reduced condenser area lowers high-side pressure below normal range

23. A technician is diagnosing a vehicle where the A/C compressor does not engage. The scan tool shows the module is NOT commanding the relay. The ambient temperature is 75°F, the engine is at operating temperature, and the A/C button is pressed. The evaporator temp sensor reads 65°F. The A/C pressure sensor reads 0 psi. What is the MOST likely reason the module is not commanding the relay?

- A. The A/C pressure sensor reads 0 psi, indicating the system has no charge and the module will not authorize engagement
- B. The evaporator temperature sensor reading of 65°F is above the module's maximum engagement temperature limit
- C. The ambient temperature of 75°F is below the module's minimum ambient threshold for A/C compressor activation

D. The engine coolant temperature must reach a specific high-temperature threshold before A/C engagement is allowed

24. Technician A says that a voltage drop test on a circuit must be performed with the circuit energized and current flowing through the component being tested. Technician B says that an ohmmeter test for resistance should be performed with the circuit de-energized and the component disconnected. Who is correct?

- A. Technician A only, because resistance testing can be performed on a powered circuit without any risk
- B. Technician B only, because voltage drop tests produce inaccurate readings when current is flowing
- C. Both Technician A and Technician B are correct about the proper conditions for each respective test
- D. Neither Technician A nor Technician B, because both tests can be performed under any circuit condition

25. A vehicle's A/C system was working normally until the owner had aftermarket remote start installed at an electronics shop. Since the installation, the A/C compressor does not engage when the remote start activates the engine, but it works normally when the owner starts the engine with the key. What is the MOST likely cause?

- A. The remote start system does not activate the ignition-run circuit that the HVAC module needs to authorize A/C
- B. The remote start module is not programmed to send the A/C request signal to the HVAC control module
- C. The aftermarket remote start unit is creating electrical interference that prevents compressor clutch engagement
- D. The compressor clutch coil cannot draw adequate current through the remote start system's thinner wiring

26. A vehicle's scan tool HVAC data shows the blend door actuator commanded to 80% (near full hot) and the actual position at 80%. The set temperature is 80°F, the in-car sensor reads 65°F, and the

ambient temperature is 40°F. The customer complains of inadequate heat. The vent temperature from the floor vent is only 100°F. What should the technician check?

- A. The blend door actuator calibration since 80% may not correspond to the actual full hot mechanical position
- B. The in-car temperature sensor accuracy since a reading colder than actual would limit heating response
- C. The HVAC module programming for a software update that corrects the heating algorithm for cold weather
- D. The engine coolant temperature to verify the engine is reaching full operating temperature for maximum heat output

27. Technician A says that a fixed orifice tube has no moving parts and cannot adjust its flow rate in response to changing conditions. Technician B says that some aftermarket variable orifice tubes use a spring-loaded piston to provide limited flow adjustment based on pressure differential. Who is correct?

- A. Both Technician A and Technician B are correct about fixed and variable orifice tube designs
- B. Technician A only, because no orifice tube design of any kind has any internal moving components
- C. Technician B only, because standard OEM orifice tubes also include the spring-loaded piston mechanism
- D. Neither Technician A nor Technician B, because all orifice tubes actively regulate flow like a TXV

28. A vehicle's A/C system produces adequate cooling but the customer reports an intermittent chirping noise from the engine compartment that occurs only when the A/C compressor clutch is engaged. The noise stops immediately when the A/C is turned off. The belt is two months old and the tensioner was replaced at the same time. What should the technician check FIRST?

- A. The compressor clutch air gap for an excessively wide measurement that causes the hub to slip during operation

- B. The compressor clutch pulley alignment relative to the other pulleys in the serpentine belt drive system
- C. The compressor for internal mechanical failure that is creating abnormal resistance when the clutch engages
- D. The new belt's rib depth using a belt wear gauge since even new belts can occasionally arrive with defects

29. A vehicle has an ATC system that maintains the set temperature correctly in AUTO mode. However, when the driver manually selects a specific blower speed, the vent temperature becomes noticeably warmer or cooler than the set temperature. What is the MOST likely explanation?

- A. A faulty blower motor controller that produces incorrect voltages when operating in manual speed mode
- B. The blend door actuator has a fault that only manifests when the module switches from AUTO to manual logic
- C. The HVAC module's temperature control algorithm is not designed to compensate when the driver overrides fan speed
- D. In manual blower mode, the module may not adjust the blend door position as precisely as in full AUTO mode because the driver has overridden one variable in the control equation

30. A vehicle's engine overheated on the highway. After the engine cooled, the customer drove it to the shop. The A/C now blows warm air. The compressor clutch engages and the compressor seems to run. The low-side pressure reads 72 psi and the high-side reads 78 psi at 80°F ambient. What is the MOST likely cause?

- A. The compressor has sustained internal damage from the overheating event and can no longer compress refrigerant
- B. The condenser tubes have melted together from the extreme engine compartment heat during the overheat
- C. The TXV sensing bulb was damaged by the high under-hood temperatures and is now stuck fully open

D. The refrigerant has chemically decomposed from the extreme temperatures and lost its thermodynamic properties

31. A vehicle with dual-zone climate control has both the driver and passenger temperature controls set to 72°F. The driver side maintains 72°F correctly. The passenger side runs 6°F warmer at 78°F. The scan tool shows both blend door actuators commanding and achieving nearly identical positions. No DTCs are stored. What should the technician investigate?

A. The passenger-side blend door for a slight physical warp that allows more air to pass over the heater core

B. Whether a passenger-side temperature sensor or duct sensor is reading inaccurately and causing incorrect feedback

C. The evaporator for uneven cooling distribution between the driver and passenger sections of the core

D. The HVAC module for a dual-zone calibration offset that can be adjusted through the scan tool parameters

32. A technician is testing the A/C compressor clutch circuit. With the clutch engaged and operating, the technician measures voltage at the clutch coil positive terminal and reads 11.2V. Battery voltage with the engine running is 14.1V. What does this 2.9V difference indicate?

A. Normal clutch coil operation, as the coil's internal resistance naturally drops the available voltage by this amount

B. The charging system is not maintaining adequate voltage and needs to be tested for output capacity

C. Excessive voltage drop in the power supply circuit feeding the clutch coil, reducing current flow and magnetic force

D. The clutch coil has developed a partial internal short that is pulling the voltage down at the connector

33. A vehicle's A/C system was charged with the correct amount of refrigerant after a leak repair. The system cools well immediately after the service. Three days later, the customer reports the system still

cools well but has noticed small drips of water from under the dashboard on the passenger side. What is the MOST likely cause?

- A. A clogged evaporator condensation drain tube that is causing water to back up and overflow inside the housing
- B. A leaking evaporator core that is dripping refrigerant oil mixed with condensation inside the HVAC housing
- C. The heater core is seeping coolant from a connection that was disturbed during the A/C leak repair
- D. Normal condensation overflow that occurs when the system is first used after an extended period of non-operation

34. Technician A says that when pressure testing a cooling system, the technician should pressurize to the cap's rated pressure and then pump an additional 5 psi above the rating to stress-test the system. Technician B says the system should never be pressurized above the cap's rated pressure during testing. Who is correct?

- A. Technician A only, because the 5 psi margin ensures the weakest component is identified during the test
- B. Both Technician A and Technician B, because the correct pressure depends on the age of the cooling system
- C. Technician B only, because exceeding the rated pressure can damage hoses, gaskets, or the heater core
- D. Neither Technician A nor Technician B, because the correct test pressure is always 20 psi regardless of cap rating

35. A vehicle's A/C system blows cold air from the dashboard panel vents but warm air from the rear auxiliary system vents. The front system gauge pressures are normal. The rear blower motor operates at all speeds. What is the MOST likely cause?

- A. A low total system refrigerant charge that is insufficient to supply adequate cooling to both evaporators
- B. A failed compressor that cannot produce enough volume to serve both the front and rear circuits together
- C. A restricted or failed rear expansion device that is not allowing adequate refrigerant into the rear evaporator
- D. A blocked rear cabin air filter that is restricting airflow across the rear evaporator heat exchanger surface

36. A vehicle with electronic HVAC has a complaint that the blower motor starts at high speed every time the ignition is turned on, runs for about 5 seconds, then adjusts to the last-used speed setting. This happens regardless of whether AUTO or manual mode is selected. What does this behavior indicate?

- A. A faulty blower motor controller that sends full voltage briefly before its internal regulator circuit activates
- B. Normal HVAC system initialization behavior where the module tests the blower motor during the startup sequence
- C. A failing HVAC control module that momentarily loses its stored memory settings during each ignition cycle
- D. A high-speed relay with sticky contacts that remain closed briefly before the controller can open them at startup

37. A vehicle owner reports that the A/C system works perfectly on every day except when they park the vehicle in their enclosed garage overnight. On those mornings, the A/C takes 15–20 minutes to begin cooling, whereas it cools within 3–5 minutes when parked outside. There is no other vehicle or equipment running in the garage. What could cause this difference?

- A. The enclosed garage traps engine exhaust from the previous evening that chemically interferes with the refrigerant
- B. The garage temperature is different from outdoor temperature, affecting the initial cabin heat load and pull-down time

C. The garage's enclosed environment allows moisture to accumulate on the evaporator overnight, requiring extra time to clear

D. The enclosed garage prevents natural air circulation, allowing the vehicle's residual engine heat to keep the cabin warmer overnight

38. A technician is diagnosing a vehicle where the heater blows hot air for 2–3 minutes after a cold start, then the air turns cold for 1–2 minutes, then returns to hot. This cycle repeats for the first 10 minutes of driving before the heater finally produces consistent hot air. What is the MOST likely cause?

A. A failing thermostat that sticks intermittently between open and closed during the warm-up period

B. A large air pocket in the cooling system that circulates through the heater core intermittently during warm-up

C. A water pump with a loose impeller that slips on the shaft intermittently until thermal expansion locks it

D. A faulty engine temperature sensor that sends erratic readings causing the ATC module to vary blend door position

39. A vehicle's compressor makes a knocking noise at idle that increases with RPM. The noise is present only when the A/C is engaged. The technician measures the compressor oil and finds it is only 1 ounce — the specification is 5 ounces for the compressor alone. What is the MOST likely diagnosis?

A. The compressor bearings have failed due to age and need replacement regardless of the oil level correction

B. The compressor is being damaged from insufficient lubrication and the system must be inspected for the cause of oil loss

C. The knocking is normal for a compressor at idle and the low oil was coincidentally discovered during inspection

D. The compressor reed valves have failed mechanically from the low oil level and the noise is from valve flutter

40. A technician charges an A/C system and then measures the system pressures with the engine at 1,500 RPM, blower on high, and doors open at 80°F ambient. The low side reads 28 psi, the high side reads 178 psi, and the vent temperature is 44°F. The technician then increases the engine speed to 2,500 RPM. The low side drops to 22 psi and the high side rises to 210 psi. The vent temperature drops to 39°F. What does this pressure change with RPM indicate?

- A. The system is overcharged because the pressures should not change significantly with engine speed increases
- B. The compressor has worn internal components that bypass refrigerant at lower RPM but seal better at higher RPM
- C. Normal system response — higher compressor speed increases refrigerant flow, lowering the low side and raising the high side
- D. The drive belt is slipping at 1,500 RPM and only grips the compressor pulley adequately at the higher engine speed

41. On a vehicle with an ATC system, the driver selects 72°F. After the cabin reaches 72°F, the driver notices the A/C compressor continues to run even though no cooling should be needed. The evaporator temperature reads 37°F and the blend door is at 35% (mixing warm air with the cold evaporator air to maintain 72°F). Is this normal?

- A. Yes — the ATC module runs the compressor continuously and uses the blend door to maintain the set temperature by mixing cold and warm air
- B. No — the compressor should cycle off once the set temperature is reached to conserve fuel and reduce wear
- C. Yes — but only in vehicles with variable displacement compressors that automatically reduce output at set point
- D. No — the evaporator temperature of 37°F indicates the system is overcooling and the compressor should disengage

42. A vehicle has a DTC P0128 — Coolant Thermostat Below Thermostat Regulating Temperature. The engine temperature gauge reads slightly below the normal range. The customer's primary complaint is poor heater performance. What should the technician recommend?

- A. Replace the engine control module since the DTC indicates an ECM calibration error in temperature monitoring
- B. Flush the cooling system since the code indicates contaminated coolant is preventing proper heat transfer
- C. Inspect the coolant temperature sensor wiring since the code is likely caused by a false low reading from the sensor
- D. Replace the thermostat since P0128 typically indicates the thermostat is opening too early or is stuck open

43. A vehicle's A/C system was working normally but has gradually lost cooling over the past six months. The technician recovers the refrigerant and finds the charge is 4 ounces low (16 of 20 ounces). A UV dye scan reveals bright fluorescent traces at the Schrader valve core on the high-side service port. What should the technician do?

- A. Simply recharge the system since Schrader valve leaks are too small to require repair and will self-seal
- B. Replace the high-side service port assembly since the Schrader valve is integrated and not separately replaceable
- C. Replace the Schrader valve core in the high-side service port, evacuate the system, and recharge to specification
- D. Tighten the service port cap since caps with O-rings are the primary seal and the Schrader valve is a backup

44. Technician A says that a heater core flush should be performed in the reverse direction of normal coolant flow to push debris out through the inlet. Technician B says that alternating flush direction — forward and reverse — is more effective at dislodging stubborn deposits than reverse-only flushing. Who is correct?

- A. Technician A only, because alternating directions can push debris deeper into passages and worsen restriction
- B. Both Technician A and Technician B are correct about effective heater core flushing techniques

C. Technician B only, because reverse-only flushing risks pushing debris into areas that are harder to clear

D. Neither Technician A nor Technician B, because heater core flushing is ineffective and replacement is always required

45. A vehicle's A/C compressor is running and the gauges show normal pressures. The vent temperature is 42°F. However, the customer reports that the A/C output seems "weak" — there is not enough cold air coming from the vents, though what does come out is cold. What is the MOST likely cause?

A. A restricted cabin air filter or blocked evaporator face reducing the total volume of air passing through the system

B. A failing compressor that is producing adequate pressures but insufficient total refrigerant flow volume

C. An undercharged system that is cooling the air properly but cannot sustain the cold temperature under load

D. A condenser restriction that reduces the total BTU capacity of the system below its designed output level

46. On a vehicle with a clutchless variable displacement compressor, the scan tool shows the compressor displacement command at 5% (near minimum). The A/C button is pressed and the system should be cooling. The ambient temperature is 92°F and the cabin is at 95°F. What is the MOST likely cause?

A. Normal system operation where the module starts at minimum displacement and ramps up gradually for comfort

B. A low refrigerant charge that has triggered the module to reduce displacement as a compressor protection strategy

C. A failed A/C request switch that is not communicating the driver's cooling request to the HVAC control module

D. A failed electronic displacement control valve stuck at minimum, preventing the compressor from increasing output

47. A vehicle's cooling system uses a degas bottle (pressurized coolant reservoir) instead of a conventional overflow-type reservoir. What is the functional difference between these two designs?

- A. The degas bottle operates at atmospheric pressure while the overflow reservoir operates under system pressure
- B. The degas bottle requires a separate pressure cap while the overflow reservoir is sealed without a cap
- C. The degas bottle is part of the pressurized system and contains the pressure cap, while an overflow reservoir is not pressurized
- D. There is no functional difference — the terms are interchangeable for the same component across manufacturers

48. A technician is performing a final leak check after an A/C repair. The system has been charged and is operating normally. The technician uses an electronic leak detector and scans all fittings and connections. At one of the repaired fittings, the detector produces a faint, intermittent alarm. What should the technician do?

- A. Recheck the fitting carefully by cleaning the area with a rag and rescanning slowly to confirm or eliminate the reading
- B. Immediately recover the refrigerant and disassemble the fitting to replace the O-ring a second time
- C. Ignore the faint reading since electronic detectors often produce false alarms near recently assembled fittings
- D. Add UV dye to the system and instruct the customer to return in one week for a confirmatory dye inspection

49. Technician A says that the condenser must be flushed in the reverse direction of normal refrigerant flow when cleaning it after a compressor failure. Technician B says that the evaporator should also be flushed when the compressor failure produced internal debris. Who is correct?

- A. Technician A only, because the evaporator should never be flushed and must always be replaced after failure

- B. Technician B only, because condenser flushing direction does not matter as long as the solvent passes through
- C. Both Technician A and Technician B are correct about proper flushing direction and the need to flush the evaporator
- D. Neither Technician A nor Technician B, because modern systems use self-cleaning filtration and do not require flushing

50. A vehicle's A/C compressor clutch has been replaced because of a worn friction surface. After the repair, the clutch engages firmly with no slip. However, within two weeks the customer returns reporting the clutch is slipping again. What should the technician investigate as the root cause?

- A. Whether the clutch air gap was set correctly during installation, as an incorrect gap accelerates friction wear
- B. Whether the compressor is mechanically seizing intermittently, creating excessive torque loads that burn the clutch
- C. Whether the replacement clutch was a low-quality aftermarket part that does not meet the OEM friction specification
- D. Whether the drive belt tension is insufficient, causing belt slip that was misdiagnosed as clutch slip originally

Practice Exam 9: Answer Key and Explanations

1. B — A supply hose at 198°F with a return hose at only 115°F represents an 83°F temperature drop across the heater core — far greater than the normal 20°F–40°F differential expected when coolant flows freely. This excessive temperature drop indicates the coolant is spending too long inside the core because flow is restricted. A partially clogged heater core passes some coolant (the return hose is warm, not cold) but not enough volume to deliver maximum heat to the cabin air.

2. D — A broken reed valve with a missing fragment means metallic debris has entered the refrigerant circuit and traveled through the condenser, liquid line, and potentially the metering device and evaporator. The system must be flushed to remove all debris, the orifice tube or TXV must be replaced (their screens trap debris and the precision valve cannot function with contamination), and the accumulator or receiver-drier must be replaced (fresh desiccant and the system was opened). This prevents the new compressor from being destroyed by circulating debris.

3. C — Superheat of 10°F falls within the normal 8°F–12°F TXV specification, subcooling of 14°F falls within the normal 10°F–20°F range, gauge pressures are normal, and a vent temperature of 44°F at 82°F ambient represents a 38°F temperature drop — well within the expected 35°F–50°F performance range. Every measured parameter confirms the system is operating within its designed specifications. The customer's memory of colder temperatures may not be accurate, or conditions may have differed.

4. A — The scan tool confirms the blend door is at 0% (full cold) and the evaporator is cooling properly at 36°F — both the refrigeration and air management systems are functioning correctly. Yet the vent temperature is 78°F, meaning hot air is being added to the cold airstream somewhere. A heater control valve stuck in the open position allows hot engine coolant to flow through the heater core continuously, adding radiant heat to the air even though the blend door directs most air away from the core.

5. B — Technician B is correct that rear auxiliary A/C systems add significant internal volume — a second evaporator, a second expansion device, and extended refrigerant lines running from the engine compartment to the rear of the vehicle — all of which require additional refrigerant. Technician A is incorrect because the additional charge amount varies by vehicle design and is never a simple doubling formula. Always verify the exact charge on the underhood label, which accounts for the specific rear system configuration.

6. D — DTC U0073 (Communication Bus Off) combined with the scan tool unable to communicate with any module indicates a complete CAN bus failure — not a single-module problem. A short between CAN High and CAN Low, an open in either CAN wire, a short to battery voltage or ground, or a missing termination resistor would disable communication for every module on the affected bus segment simultaneously. The bus wiring, connectors, and termination must be inspected and repaired.

7. A — Both technicians are correct. Technician A is right that scroll compressors have fewer moving parts — no pistons, connecting rods, or crankshaft — using only two interlocking spirals (one fixed, one orbiting) and an eccentric bearing. Technician B is right that scroll compressors have greater tolerance for brief liquid exposure because the scrolls can flex slightly to accommodate incompressible liquid, whereas a reciprocating piston against liquid creates immediate hydraulic lock and mechanical damage.

8. C — The A/C compressor engages in defrost mode and the evaporator cools to 37°F — confirming the dehumidification system is functional. If the windshield still fogs during rainy conditions, the most likely cause is the air inlet door stuck in the recirculation position. Recirculated cabin air is already moisture-laden from the occupants' breathing and wet clothing. Without introducing fresh outside air

(which is typically drier than the recirculated cabin air), the evaporator cannot remove enough moisture to prevent windshield fogging.

9. D — Every measured parameter falls within normal specifications: low-side 35 psi and high-side 220 psi are textbook for 88°F ambient, vent temperature of 46°F is within expected range, subcooling of 16°F confirms adequate liquid production, superheat of 11°F confirms proper TXV operation, and the condenser temperature drop of 68°F (172°F inlet to 104°F outlet) — while on the higher end — demonstrates effective heat rejection. The system is performing correctly across all measurements.

10. B — The micron gauge stabilized at 1,200 microns — it rose from the pump's capability and then stopped rising. A stabilized reading (not continuously climbing) indicates residual moisture, not a leak. The moisture has boiled off at the current vacuum level and the resulting vapor pressure has stabilized the reading at 1,200 microns. Continuing to evacuate will allow the pump to gradually remove this vapor and pull the reading lower. If the reading had climbed without stabilizing, a leak would be indicated.

11. A — All sensor readings are within normal range, the system maintains the set temperature correctly, and the compressor and blend door are operating as expected. The customer's complaint of excessive dryness is a natural consequence of normal A/C operation — the cold evaporator surface continuously condenses moisture from the cabin air, dehumidifying it as a byproduct of the cooling process. Some occupants are more sensitive to low humidity than others. This is not a system fault.

12. C — A faint whistling noise from the condenser area after replacement is most commonly caused by normal refrigerant flow through the new parallel flow condenser's micro-channels. Different condenser manufacturers use slightly different internal tube geometries, baffle arrangements, and channel sizes, which can create flow characteristics that produce sounds different from the original condenser. If pressures and performance are normal, the noise is a characteristic of the new condenser design and not a defect.

13. B — Jumping relay socket terminals 30 and 87 bypasses the relay and sends power directly to the clutch circuit — and the clutch engages, proving everything downstream of the relay (wiring, pressure switches, clutch coil, and ground) is functional. The scan tool confirms the module is commanding the relay ON, proving the module is sending the ground signal. The only remaining component between the module's command and the clutch circuit is the relay itself — its contacts are not closing despite the coil receiving the command.

14. D — The infrared thermometer reads 120°F (engine just started — consistent with a cold engine beginning warm-up) while the scan tool shows the ECT sensor reading 280°F — a massive discrepancy.

The engine management system sees 280°F and commands the fan to maximum speed as an emergency overheating response. The engine is not actually overheating — the coolant temperature sensor is sending a drastically false high reading that triggers the defensive fan response.

15. A — R-1234yf systems require PAG oil specifically formulated for the HFO refrigerant — typically designated as "PAG YF" oil. Standard R-134a PAG oil has a different additive package and may not be compatible with R-1234yf's chemistry and the specific seal materials used in R-1234yf systems. Using the wrong oil type risks seal degradation, inadequate lubrication, and system damage. Always use the oil type specified by the compressor manufacturer for the specific refrigerant.

16. C — The hand vacuum pump test isolates the actuator from the vehicle's vacuum supply system. When vacuum is applied directly and holds for 30 seconds before slowly bleeding off, the actuator's diaphragm has a small leak — large enough to bleed vacuum over 3 minutes but small enough to initially hold. A supply hose leak would not be detected by this test since the pump connects directly to the actuator. The actuator must be replaced because it cannot maintain vacuum long enough to hold the door in position during normal operation.

17. B — Sight glass diagnosis is unreliable for R-134a systems. R-134a's operating characteristics and oil miscibility properties commonly produce visible bubbles in the sight glass even when the system is properly charged and performing correctly. The vent temperature of 42°F and normal gauge pressures confirm the system is functioning within specification. Adding refrigerant to eliminate bubbles in an R-134a sight glass would likely overcharge the system. Charge accuracy should be verified by weight and subcooling measurement.

18. D — Both heater hoses are hot (confirming coolant is flowing) and the correct coolant type at proper concentration is present. A new heater core that loses heat output within six months — without an obvious external cause — points to internal contamination from the old cooling system. If the system was not thoroughly flushed before the new core was installed, residual deposits, corrosion products, and sludge from the old system gradually migrate to and accumulate in the new core's passages, progressively restricting flow and reducing heat transfer.

19. A — Rapid 2-second cycling with wildly oscillating pressures (low side swinging 15–40 psi, high side swinging 125–220 psi) immediately after another facility's recharge strongly suggests a refrigerant overcharge. Excess refrigerant floods the evaporator with liquid that the compressor struggles to handle, the cycling switch trips as pressures spike, pressures partially equalize during the off cycle, and the compressor re-engages only to repeat. The extreme pressure swings with each 2-second cycle are characteristic of the system struggling with too much refrigerant.

20. C — The evaporator sensor reads 55°F while the actual temperature is 38°F — the sensor reports warmer than reality. This means the module believes the evaporator has not reached optimal cooling temperature and will command the compressor to run more aggressively, not less. Since the actual evaporator is cooling to 38°F and the module is allowing full compressor operation, the sensor error would not limit cooling performance. The poor cooling complaint likely has a different cause — the sensor discrepancy, while present, is actually working in favor of maximum cooling output in this scenario.

21. D — The scan tool shows the commanded and actual positions are nearly identical (45% vs 44% — a 1% difference within normal tolerance) and the system maintains temperature correctly. However, the buzzing noise indicates the actuator motor is running continuously. In normal operation, the motor should stop once the door reaches the commanded position. A door that tends to drift from its commanded position — due to airflow pressure, a weak return spring, or internal friction — forces the motor to run continuously to hold position, producing the buzzing.

22. A — A parallel flow condenser with the top two rows of tubes crushed has lost a portion of its heat rejection surface area. The remaining undamaged lower section can still condense refrigerant, so the system will continue to cool — but with reduced efficiency because less total surface area is available for heat rejection. High-side pressure will be elevated, subcooling may be reduced, and cooling performance will degrade, particularly on hot days when the condenser is already working near capacity. The condenser should be replaced.

23. A — The A/C pressure sensor reads 0 psi, which tells the module the system has no refrigerant charge. The module's programming includes a low-pressure lockout that prevents compressor engagement when the charge is critically low — this protects the compressor from running without adequate refrigerant and oil. All other parameters (ambient temp, engine temp, A/C button) are within normal engagement limits, so the 0 psi pressure reading is the specific parameter preventing the module from commanding the relay.

24. C — Both technicians describe correct testing procedures for their respective measurements. Technician A is right that voltage drop testing requires the circuit to be energized with current flowing — voltage drop only appears when current flows through resistance. Technician B is right that resistance (ohm) testing must be performed with the circuit de-energized and the component disconnected — applying an ohmmeter to a powered circuit produces false readings and can damage the meter.

25. B — Aftermarket remote start systems activate the engine and basic electrical systems but may not fully replicate all of the signal pathways that a normal key-start provides. The A/C compressor engagement typically requires the HVAC module to receive the A/C request signal from the control panel, which may depend on specific ignition-run circuits or data bus messages that the remote start does not generate. With a normal key start, all circuits activate fully and the A/C works. The remote start installer needs to verify proper integration with the HVAC system.

26. D — The module commands 80% (near full hot) and the actuator achieves it — the air management system is working correctly. The in-car sensor reads 65°F in a 40°F ambient environment, suggesting the cabin needs significant heating. If the vent temperature is only 100°F despite the blend door being near full hot, the heat source itself is insufficient. Verifying the engine coolant temperature confirms whether the engine is reaching the 195°F–210°F operating range needed to supply adequate heat through the heater core.

27. A — Both technicians are correct. Technician A accurately describes the standard fixed orifice tube — a simple cylindrical tube with a precision-sized hole and no moving parts, relying entirely on pressure differential to control flow. Technician B correctly identifies that some aftermarket variable orifice tubes use a spring-loaded piston inside the tube body that adjusts the effective opening size based on the pressure difference across it, providing limited flow modulation while maintaining the simplicity of an orifice tube installation.

28. B — A chirping noise that occurs only when the compressor clutch engages and stops when the A/C is turned off suggests the belt tracking changes when the clutch hub contacts the pulley. A misaligned compressor clutch pulley relative to the other pulleys in the drive system forces the belt to shift its tracking angle each time the clutch engages, producing a chirping sound. The belt and tensioner are new (ruling out wear), so alignment is the most logical first check.

29. D — In AUTO mode, the ATC module controls both the blower speed and the blend door position simultaneously, optimizing both variables together to maintain the set temperature. When the driver manually selects a specific blower speed, the module loses control of one variable — it can still adjust the blend door, but its calculations assume a specific relationship between airflow volume and door position. Overriding the blower speed changes the airflow volume, which alters the effective heat transfer rate and may cause the vent temperature to deviate from the set point.

30. A — Pressures of 72 psi low / 78 psi high are nearly equalized — the compressor is running but unable to create a meaningful pressure differential between the high and low sides. This is the signature pattern of a compressor with severe internal damage. The engine overheating event subjected the compressor to extreme temperatures that could have damaged seals, warped valve plates, or degraded

the lubrication, leading to internal component failure. The compressor must be replaced along with standard contamination cleanup.

31. B — Both actuators command and achieve nearly identical positions, and no DTCs are stored — the mechanical and electrical systems appear to be functioning correctly on both sides. Yet the passenger side runs 6°F warmer. Since the control system is working as designed but the output differs between zones, the most likely cause is a sensor or feedback error that gives the module incorrect information about the passenger side's actual conditions. A slightly inaccurate passenger-side temperature sensor would cause the module to calculate an incorrect blend position.

32. C — Battery voltage is 14.1V but only 11.2V reaches the clutch coil — a 2.9V loss across the power supply circuit. This far exceeds the maximum acceptable 0.5V voltage drop for a power-side circuit. The 2.9V is being consumed by unwanted resistance somewhere in the path from battery to coil — a corroded connector, a burned relay contact, a damaged wire, or a high-resistance pressure switch. This reduced voltage produces less current through the coil, weakening the magnetic field and potentially causing clutch slippage or non-engagement.

33. A — The A/C system cools well (confirming the refrigeration circuit is intact and the leak repair was successful), but water drips from under the dashboard on the passenger side. This is the classic symptom of a clogged evaporator condensation drain tube. The cold evaporator continuously condenses moisture from the cabin air, and if the drain tube is blocked, this water accumulates in the HVAC housing and eventually overflows onto the passenger floorboard. The drain tube must be cleared — this is unrelated to the A/C leak repair.

34. C — Technician B is correct that the cooling system should never be pressurized above the cap's rated pressure during testing. The cap's rated pressure represents the maximum safe operating pressure for the system — components like heater cores, hoses, and plastic fittings are designed to withstand the cap's rated pressure with a safety margin but not significantly more. Exceeding the rated pressure risks rupturing a heater core, blowing a hose, or damaging a plastic fitting.

35. C — The front system works normally with correct pressures, proving the compressor, condenser, and total refrigerant charge are adequate. The rear blower operates at all speeds, confirming the rear air distribution side is functional. The problem is isolated to the rear refrigeration circuit. A restricted or failed rear expansion device prevents adequate refrigerant from entering the rear evaporator — the refrigerant flows preferentially to the front evaporator while the rear is starved.

36. B — Many ATC systems perform a startup self-test sequence when the ignition is turned on. During this sequence, the module commands the blower to full speed briefly, drives each door actuator through its range, and verifies that all components respond. This initialization takes approximately 3–8 seconds and establishes the module's operating reference points for the session. The brief full-speed blower burst followed by adjustment to the stored setting is normal programmed behavior.

37. D — An enclosed garage traps the vehicle's residual engine heat — the engine, exhaust, and engine compartment radiate heat into the enclosed space for hours after parking. Without natural air circulation, this trapped heat keeps the cabin, dashboard, and surrounding air significantly warmer overnight than if the vehicle were parked outside where wind and open-air convection carry the heat away. The warmer starting cabin temperature on garage-parked mornings requires more pull-down time to reach the same target.

38. B — Cyclical hot-cold-hot behavior during the first 10 minutes of cold-start operation that eventually resolves is the classic symptom of a large air pocket circulating through the cooling system. The air pocket intermittently displaces coolant in the heater core — when coolant fills the core, heat is produced; when the air pocket passes through, heat output drops; when coolant refills, heat returns. As the engine warms and the thermostat opens, increased flow and thermal expansion gradually purge the air pocket, and heating becomes consistent.

39. B — A compressor with only 1 ounce of oil when the specification calls for 5 ounces is severely under-lubricated. The knocking noise — present only when the A/C is engaged — results from metal-to-metal contact inside the compressor where the oil film has been depleted. The compressor is being actively damaged with each operating minute. The immediate priority is determining why the oil level is so low — possible causes include a leak that lost both refrigerant and oil, excessive oil removal during previous service, or oil trapped in other components after incorrect service.

40. C — Normal system behavior dictates that when engine speed increases, the belt-driven compressor spins faster and pumps more refrigerant per unit time. The increased pumping rate pulls more refrigerant from the evaporator (dropping low-side pressure from 28 to 22 psi) and delivers more compressed refrigerant to the condenser (raising high-side pressure from 178 to 210 psi). The improved refrigerant flow produces better evaporator cooling (vent temperature drops from 44°F to 39°F). This is exactly the expected pressure-RPM relationship.

41. A — In many ATC systems — particularly those with variable displacement compressors or continuously running TXV systems — the compressor runs continuously and the blend door controls cabin temperature by mixing cold evaporator air with warm heater core air. The module maintains exactly 72°F by positioning the blend door at 35% — blending enough warm air into the cold stream to

produce the target temperature. This is normal closed-loop ATC operation, not a malfunction. The compressor running at 72°F set point is by design.

42. D — DTC P0128 specifically indicates the engine coolant temperature did not reach the thermostat's regulating temperature within the expected warm-up period — the engine is running cooler than designed. This directly correlates with the customer's poor heater complaint because lower coolant temperature means less heat available to the heater core. The most common cause is a thermostat that has failed in the open or partially open position, allowing coolant to flow to the radiator prematurely. Replacing the thermostat addresses both the DTC and the heating complaint.

43. C — A Schrader valve core in the service port is a common but frequently overlooked leak source. The fluorescent UV dye traces at the high-side service port valve core confirm this specific component as the leak source. Schrader valve cores are independently replaceable using a valve core removal tool — the core can be unscrewed and a new one installed without replacing the entire service port assembly. After replacement, evacuate the system and recharge to specification.

44. B — Both technicians describe effective flushing techniques. Technician A is correct that reverse-direction flushing pushes debris back out through the inlet it entered, which is the primary flushing direction. Technician B is correct that alternating between forward and reverse flow is even more effective because the changing flow direction dislodges deposits that may be adhered to passage walls in both directions, loosening stubborn contamination that single-direction flushing might not remove.

45. A — The vent temperature is an excellent 42°F — the air coming out is cold. The customer's complaint is that there is not enough of it — the volume of cold air is insufficient, not the temperature. This airflow volume issue points to a restriction in the air path before or through the evaporator. A severely clogged cabin air filter or debris accumulation on the evaporator face restricts the total volume of air the blower can push through the housing, reducing the perceived cooling output even though the air that does pass through is properly cooled.

46. D — The scan tool shows the compressor displacement command at only 5% despite the cabin being at 95°F with a 92°F ambient — conditions that demand maximum cooling. The A/C button is pressed and the system should be commanding full displacement. In a clutchless variable displacement compressor, the electronic control valve regulates displacement. A control valve stuck at minimum displacement prevents the compressor from increasing its output regardless of demand, producing minimal cooling even though the compressor shaft continues turning.

47. C — A degas bottle is a pressurized component — it is part of the sealed, pressurized cooling system and typically contains the system's pressure cap. Coolant flows through the degas bottle during normal operation, and trapped air and vapor collect at the top of the bottle and are vented when the cap releases. A conventional overflow reservoir sits outside the pressurized system — it only receives coolant pushed out through the cap's relief valve and returns it when the system cools. The degas bottle actively participates in system circulation; the overflow reservoir does not.

48. A — A faint, intermittent detector alarm at a recently assembled fitting warrants careful verification — not immediate disassembly or dismissal. Residual refrigerant vapor from the assembly process, fingerprint oils, or cleaning solvents can produce false positives. The technician should clean the area thoroughly with a dry rag to remove any surface contamination, allow a few seconds for any residual vapor to dissipate, and then rescan the fitting slowly and methodically. If the alarm repeats after cleaning, the fitting requires further investigation.

49. C — Both technicians describe correct flushing practices. Technician A is right that flushing should be performed in the reverse direction of normal refrigerant flow — pushing debris back out through the inlet rather than forcing it deeper into the component. Technician B is right that the evaporator must also be flushed when compressor failure produces debris, because metallic particles and sludge travel through the entire circuit and contaminate the evaporator as well as the condenser and lines.

50. B — A clutch friction surface that wears out again within two weeks of replacement suggests abnormally high torque demand is being placed on the clutch during each engagement. A compressor that is intermittently seizing or experiencing abnormally high internal resistance creates excessive mechanical load that the clutch must overcome, generating heat and friction that rapidly burns through the friction material. The compressor's internal condition must be evaluated — bearing wear, insufficient lubrication, or intermittent mechanical binding would explain the accelerated clutch wear.