

# PRACTICE EXAM 3: T7 SIMULATION

## (40 QUESTIONS)

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1. A heavy-duty truck A/C system shows low cooling output. Manifold gauges show low-side at 15 psi and high-side at 100 psi at idle. The next step should be:

- A. Replace the compressor as the primary cause
- B. Replace the expansion valve to restore proper metering
- C. Recover refrigerant and check for leaks before recharging
- D. Replace the receiver-drier to absorb additional moisture

2. A heavy-duty truck A/C compressor clutch fails to engage when A/C is requested. Voltage at the clutch coil reads 0 volts with the request active. The next step should be:

- A. Trace the compressor clutch power circuit back to the relay or control module
- B. Replace the compressor clutch assembly because of internal damage
- C. Replace the body controller because of clutch control failure
- D. Replace the high-pressure cutoff switch as the most common cause

3. A heavy-duty truck A/C system shows manifold gauges at 50 psi low-side and 350 psi high-side at idle. The compressor is engaged. The next diagnostic step should be:

- A. Replace the compressor because of high pressure
- B. Replace the expansion valve because of restricted flow
- C. Replace the receiver-drier as the most common cause
- D. Verify condenser airflow and check for restricted high-side flow

4. A heavy-duty truck A/C system shows manifold gauge readings of 60 psi low-side and 150 psi high-side. The compressor cycles rapidly. The most likely cause is:

- A. Restricted condenser airflow producing high pressures
- B. Excessive refrigerant charge in the system
- C. Failed compressor unable to develop pressure
- D. Low refrigerant charge in the system

5. A heavy-duty truck A/C system has been recently serviced. The driver returns with poor cooling. The next diagnostic step should be:

- A. Verify the refrigerant charge weight matches OEM specification
- B. Replace the compressor as the most common post-service issue
- C. Replace the expansion valve as the most common post-service issue
- D. Replace the receiver-drier as the most common post-service issue

6. A heavy-duty truck A/C system shows ice forming on the suction line at the compressor. The most likely cause is:

- A. Excessive refrigerant charge in the system
- B. Failed compressor with internal damage
- C. Failed expansion valve allowing liquid refrigerant to flood the suction line
- D. Failed condenser unable to reject heat

7. A heavy-duty truck A/C system shows oil residue on the condenser fins. The next diagnostic step should be:

- A. Recharge the system and observe for repeat leaks

- B. Use a leak detector to identify the leak source on the condenser
- C. Replace the condenser as the leak source
- D. Replace the receiver-drier as the leak source

8. A heavy-duty truck A/C system shows fluctuating gauge readings during operation. The compressor is functioning. The most likely cause is:

- A. Failed compressor with internal damage
- B. Failed condenser fan motor
- C. Excessive refrigerant charge in the system
- D. Moisture in the system causing expansion valve cycling

9. A heavy-duty truck A/C system has had its compressor replaced 3 months ago. The driver now reports complete loss of cooling. The next diagnostic step should be:

- A. Connect manifold gauges and observe pressure readings at idle
- B. Replace the compressor because of repeat failure
- C. Replace the expansion valve as the next common failure
- D. Replace the receiver-drier as the next common failure

10. A heavy-duty truck A/C system shows no cooling. Manifold gauges at idle show low-side at 90 psi and high-side at 90 psi. The most likely cause is:

- A. Excessive refrigerant charge in the system
- B. Failed expansion valve restricting flow
- C. Failed compressor with no pumping action
- D. Failed condenser fan motor

11. A heavy-duty truck A/C compressor cycles approximately every 5 seconds. The system has been recently serviced. The next diagnostic step should be:

- A. Verify refrigerant charge weight against OEM specification
- B. Replace the low-pressure cutoff switch as the most common cause
- C. Replace the compressor clutch as the most common cause
- D. Replace the receiver-drier as the most common cause

12. A heavy-duty truck A/C system shows manifold pressures of 25 psi low-side and 200 psi high-side at idle. The recommended evaporator outlet temperature is 38 to 48°F. The actual outlet temperature is 65°F. The next diagnostic step should be:

- A. Replace the compressor because of inadequate cooling
- B. Replace the expansion valve because of restricted flow
- C. Verify cabin air filter condition and evaporator airflow
- D. Replace the receiver-drier as the most common cause

13. A heavy-duty truck A/C system shows symptoms of intermittent cooling. The compressor cycles randomly during operation. The most likely cause is:

- A. Excessive refrigerant charge in the system
- B. Marginal refrigerant charge causing pressure switch cycling
- C. Failed compressor clutch with intermittent engagement
- D. Failed body controller with intermittent commands

14. A heavy-duty truck A/C system shows oil weeping at the compressor service valves. The next diagnostic step should be:

- A. Tighten the service valve caps as the most common cause

- B. Replace the compressor as the leak source
- C. Replace the service valves as the most common leak source
- D. Use a leak detector to identify the specific leak source

15. A heavy-duty truck A/C system has had its receiver-drier replaced 2 weeks ago. The driver now reports moisture-related symptoms (frost on expansion valve). The most likely cause is:

- A. The system was not adequately evacuated before recharge
- B. Failed receiver-drier from the supplier
- C. Excessive refrigerant charge in the system
- D. Failed expansion valve as the primary cause

16. A heavy-duty truck A/C system shows a refrigerant leak at the compressor shaft seal. The most likely root cause is:

- A. Excessive refrigerant charge causing seal damage
- B. Failed compressor clutch causing seal damage
- C. Worn shaft seal from accumulated service hours and contamination
- D. Failed expansion valve as the primary cause

17. A heavy-duty truck shows symptoms of inadequate cab heating. Engine coolant temperature is verified normal at 195°F. The next diagnostic step should be:

- A. Replace the heater core as the primary cause
- B. Replace the heater control valve as the primary cause
- C. Replace the engine thermostat as the primary cause
- D. Verify coolant flow through the heater core under load

18. A heavy-duty truck shows symptoms of engine overheating. Coolant level is verified normal. The next diagnostic step should be:

- A. Replace the engine thermostat as the most common cause
- B. Verify coolant flow, fan operation, and radiator condition
- C. Replace the water pump as the most common cause
- D. Replace the radiator as the most common cause

19. A heavy-duty truck cooling system shows symptoms of pressure loss. The cooling system pressure cap holds pressure normally. The next diagnostic step should be:

- A. Replace the radiator as the primary cause
- B. Replace the water pump as the primary cause
- C. Pressurize the cooling system and inspect for external leaks
- D. Replace the cylinder head gasket as the primary cause

20. A heavy-duty truck cooling system shows white smoke from the exhaust along with coolant loss. The most likely cause is:

- A. Cylinder head gasket failure allowing coolant into combustion chambers
- B. Failed water pump allowing coolant loss
- C. Failed radiator allowing coolant loss
- D. Failed heater core allowing coolant loss

21. A heavy-duty truck has had its coolant replaced 5,000 miles ago. The driver now reports overheating symptoms. The next diagnostic step should be:

- A. Replace the engine thermostat as the most common post-service cause

- B. Replace the water pump as the most common post-service cause
- C. Replace the radiator as the most common post-service cause
- D. Verify coolant level, air bleeding, and proper coolant type

22. A heavy-duty truck shows symptoms of slow warm-up to operating temperature. The engine takes 30 minutes to reach operating temperature. The most likely cause is:

- A. Failed water pump unable to circulate coolant
- B. Failed thermostat stuck in the open position
- C. Failed radiator fan motor running continuously
- D. Failed cooling system pressure cap

23. A heavy-duty truck cooling system shows symptoms of overheating only during high-load operation. Idle operation is normal. The most likely cause is:

- A. Failed thermostat stuck in the closed position
- B. Failed water pump unable to circulate coolant
- C. Restricted radiator or inadequate fan operation under load
- D. Failed cooling system pressure cap

24. A heavy-duty truck shows symptoms of coolant in the engine oil (milky oil). The next diagnostic step should be:

- A. Pressure-test the cooling system and inspect for internal leaks
- B. Replace the engine oil and continue operation
- C. Replace the water pump as the most common cause
- D. Replace the radiator as the most common cause

25. A heavy-duty truck blower motor operates at all speeds except low. The most likely cause is:

- A. Failed blower motor with internal damage
- B. Failed body controller affecting only low speed
- C. Failed HVAC switch with internal damage
- D. Failed blower resistor (specifically the low-speed resistor)

26. A heavy-duty truck HVAC system shows the temperature blend stuck in the cold position. Scan tool shows the actuator command varying with control input. The next diagnostic step should be:

- A. Replace the body controller because of incorrect commands
- B. Verify actuator power, ground, and actual movement at the blend door
- C. Replace the temperature blend door as binding
- D. Replace the HVAC control panel as the most common cause

27. A heavy-duty truck HVAC system shows defrost mode functions but vent and floor modes do not. The most likely cause is:

- A. Failed mode door actuator stuck in defrost position
- B. Failed body controller affecting non-defrost commands only
- C. Failed HVAC switch affecting non-defrost positions
- D. Failed blower motor affecting non-defrost airflow

28. A heavy-duty truck HVAC blower motor operates only intermittently. The connector at the motor shows corrosion. The next diagnostic step should be:

- A. Replace the blower motor as the primary cause
- B. Replace the blower resistor as the primary cause

- C. Clean and inspect the connector and verify motor operation
- D. Replace the HVAC control panel as the primary cause

29. A heavy-duty truck HVAC system shows symptoms of recirculation door not changing position. Scan tool shows the actuator command varying. The next diagnostic step should be:

- A. Replace the recirculation door actuator as the primary cause
- B. Replace the body controller because of command issues
- C. Replace the HVAC switch as the primary cause
- D. Verify actuator power, ground, and movement at the door

30. A heavy-duty truck HVAC system has had its body controller reflashed 5,000 miles ago. The driver now reports erratic HVAC behavior. The most likely cause is:

- A. Software calibration issues from the reflash affecting HVAC control
- B. Failed sensors unrelated to the reflash
- C. Failed actuators unrelated to the reflash
- D. Failed wiring unrelated to the reflash

31. A heavy-duty truck HVAC system shows fault codes for multiple actuators. The truck has had no recent service. The most likely common cause is:

- A. Loose or corroded power supply or ground at the HVAC controller
- B. Failed individual actuators producing simultaneous codes
- C. Failed body controller producing all codes
- D. Multiple sensor failures producing simultaneous codes

32. A heavy-duty truck HVAC system shows symptoms of inadequate airflow at all speeds. The blower motor operates at all speeds with normal sound. The next diagnostic step should be:

- A. Replace the blower motor as the primary cause
- B. Replace the blower resistor as the primary cause
- C. Replace the HVAC control panel as the primary cause
- D. Verify cabin air filter condition and ductwork for restrictions

33. A heavy-duty truck sleeper auxiliary HVAC system fails to operate during engine-off periods. The truck batteries show full charge. The next diagnostic step should be:

- A. Replace the auxiliary HVAC system as the primary cause
- B. Verify power supply and control circuit at the auxiliary HVAC system
- C. Replace the sleeper batteries as the primary cause
- D. Replace the body controller as the primary cause

34. A heavy-duty truck HVAC system has experienced multiple actuator failures over the past year. The fleet uses OEM-specification replacement actuators. The most likely root cause is:

- A. Defective actuators from the supplier across multiple deliveries
- B. Operator behavior shortening actuator life
- C. Excessive temperature or moisture in the actuator location
- D. Coincidental failures unrelated to a common cause

35. A heavy-duty truck HVAC system shows symptoms of cabin temperature not matching the setpoint. ATC system is functioning. The next diagnostic step should be:

- A. Replace the ATC controller as the primary cause

- B. Replace the cabin temperature sensor as the most common cause
- C. Replace the blend door actuator as the primary cause
- D. Verify cabin temperature sensor signal and controller calibration

36. A heavy-duty truck HVAC system shows symptoms of intermittent communication faults on the J1939 bus affecting HVAC functions. The most likely cause is:

- A. Loose or corroded J1939 bus connection at the HVAC controller
- B. Failed HVAC controller producing communication faults
- C. Failed body controller producing communication faults
- D. Failed engine ECU affecting HVAC communication

37. A heavy-duty truck A/C system shows refrigerant identifier results indicating 95% R-134a and 5% air. The next step should be:

- A. Recover the refrigerant for direct reuse
- B. Vent the contaminated refrigerant to atmosphere
- C. Recover the refrigerant for recycling or proper disposal
- D. Add the refrigerant to a different vehicle's system

38. A heavy-duty truck A/C system shows refrigerant identifier results indicating mixed R-134a and R-1234yf refrigerants. The next step should be:

- A. Recover and use as a blend for the same vehicle
- B. Recover and dispose of the contaminated refrigerant
- C. Add additional R-134a to dilute the contamination
- D. Vent to atmosphere because mixed refrigerants are not recyclable

39. A heavy-duty truck shop receives a recovered refrigerant cylinder with an unknown refrigerant type. The proper procedure is:

- A. Use a refrigerant identifier to determine the contents before any handling
- B. Mix with known R-134a for general use
- C. Dispose of the cylinder without testing
- D. Use the refrigerant assuming it is R-134a

40. The proper certification for a technician who services heavy-duty truck A/C systems containing R-134a or R-1234yf is:

- A. ASE T7 certification only
- B. EPA Section 608 Type II certification
- C. EPA Section 610 certification only
- D. EPA Section 609 certification

# PRACTICE EXAM 3: ANSWER KEY AND EXPLANATIONS

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1. C — Recover refrigerant and check for leaks before recharging. Low pressures on both sides indicate undercharge or leak, and the proper diagnostic sequence is to recover, evacuate, leak-check, and recharge to specification. Component replacement before addressing the charge level is premature.
2. A — Trace the compressor clutch power circuit back to the relay or control module. Zero volts at the clutch coil with A/C requested indicates a power supply failure to the clutch, with the next step being to trace the circuit back to identify where power is lost. Component replacement before identifying the supply fault is premature.
3. D — Verify condenser airflow and check for restricted high-side flow. High-side pressure of 350 psi at idle indicates either restricted condenser airflow or restricted high-side circuit, with these being the most common causes of high-side over-pressure. Verifying airflow and circuit condition isolates the cause before component replacement.
4. D — Low refrigerant charge in the system. Low pressures with rapid compressor cycling are the classic signature of low refrigerant charge, where the low-pressure switch repeatedly cuts out the compressor as suction pressure drops. Recharging to specification typically resolves the symptoms.
5. A — Verify the refrigerant charge weight matches OEM specification. Poor cooling immediately after service points to the service work itself, with charge level being the most common post-service issue. Verifying charge weight against OEM specification confirms or rules out this cause before further diagnosis.
6. C — Failed expansion valve allowing liquid refrigerant to flood the suction line. Ice forming on the suction line at the compressor indicates liquid refrigerant is reaching the compressor, which the expansion valve should prevent by metering refrigerant into the evaporator. A failed expansion valve allows liquid flooding into the suction line.
7. B — Use a leak detector to identify the leak source on the condenser. Oil residue on the condenser indicates a refrigerant leak (refrigerant carries oil), with leak detection identifying the specific source before component replacement. The condenser may not be the leak source — adjacent components could be the source with oil being carried by airflow.
8. D — Moisture in the system causing expansion valve cycling. Fluctuating gauge readings during operation are the classic signature of moisture in the system, where moisture freezes and thaws at

the expansion valve causing intermittent restriction. Recovery, evacuation, and recharge with new desiccant typically resolves the symptoms.

9. A — Connect manifold gauges and observe pressure readings at idle. Complete cooling loss after recent service requires manifold gauge connection to identify the system condition (charge level, compressor operation, restrictions), providing diagnostic data before component replacement. The cause could be charge loss, compressor failure, or other issues.
10. C — Failed compressor with no pumping action. Equal pressures at idle with the compressor running indicate the compressor is not pumping refrigerant from the low side to the high side, with internal compressor failure being the cause. The compressor reed valves or internal components have failed.
11. A — Verify refrigerant charge weight against OEM specification. Rapid cycling immediately after service points to the service work, with charge level being the most common post-service issue producing this symptom. Verifying charge weight confirms or rules out this cause before pressure switch or compressor service.
12. C — Verify cabin air filter condition and evaporator airflow. Normal manifold pressures with elevated outlet temperature indicate the refrigerant cycle is functioning but heat is not being removed from cabin air, with restricted airflow across the evaporator being the most common cause. Cabin air filter and ductwork inspection identifies this fault.
13. B — Marginal refrigerant charge causing pressure switch cycling. Intermittent cooling with random compressor cycling is the classic signature of marginal refrigerant charge, where the low-pressure switch occasionally cycles based on operating conditions. Verifying charge level identifies this fault.
14. D — Use a leak detector to identify the specific leak source. Oil weeping at service valves may be from the valves themselves or from upstream components with oil being deposited at the valve area. Leak detector use identifies the specific source before component replacement.
15. A — The system was not adequately evacuated before recharge. Moisture-related symptoms 2 weeks after receiver-drier replacement point to inadequate evacuation during the service, where moisture remained in the system and saturated the new desiccant. Proper evacuation procedure prevents this fault.
16. C — Worn shaft seal from accumulated service hours and contamination. Compressor shaft seal leaks are most commonly caused by accumulated service hours and contamination, with the seal being a wear item that fails over time. The other options are not typical causes of shaft seal failure.
17. D — Verify coolant flow through the heater core under load. Inadequate cab heating with verified normal engine temperature indicates the heat is available but not reaching the cab, with coolant flow through the heater core being the most likely issue. Flow verification under load identifies restrictions or air-bound conditions.

18. B — Verify coolant flow, fan operation, and radiator condition. Engine overheating with normal coolant level requires verification of cooling system function, with coolant flow, fan operation, and radiator condition being the primary inspection points. Component replacement before diagnosis wastes parts.
19. C — Pressurize the cooling system and inspect for external leaks. Coolant loss with normal pressure cap operation indicates a leak in the system, with pressurization and inspection identifying the leak source. Component replacement without leak identification may not address the actual fault.
20. A — Cylinder head gasket failure allowing coolant into combustion chambers. White smoke from the exhaust combined with coolant loss is the classic signature of cylinder head gasket failure, where coolant enters the combustion chambers and is vaporized through the exhaust. This pattern is distinct from external leaks.
21. D — Verify coolant level, air bleeding, and proper coolant type. Overheating immediately after coolant service points to the service work, with coolant level, air bleeding, and proper coolant type being the most common post-service issues. Verification of these items resolves most post-service overheating complaints.
22. B — Failed thermostat stuck in the open position. Slow warm-up to operating temperature is the classic signature of a thermostat stuck open, where coolant flows continuously through the radiator preventing rapid warm-up. Proper thermostat operation blocks flow when cold to allow rapid warm-up.
23. C — Restricted radiator or inadequate fan operation under load. Overheating only during high-load operation with normal idle indicates inadequate cooling capacity under load, with restricted radiator or inadequate fan operation being the most common causes. Idle conditions have lower cooling demand and may operate normally despite these faults.
24. A — Pressure-test the cooling system and inspect for internal leaks. Coolant in the engine oil (milky oil) indicates an internal leak between the cooling system and the engine oil system, with pressure testing identifying the leak location. Continued operation without diagnosis risks engine damage.
25. D — Failed blower resistor (specifically the low-speed resistor). A blower operating at all speeds except one specific speed indicates a failure in the resistor for that speed, with the high-speed circuit bypassing the resistor pack and other speeds depending on resistors that are functional. Specific resistor failure produces this pattern.
26. B — Verify actuator power, ground, and actual movement at the blend door. Stuck blend door with varying scan tool commands indicates the controller is sending commands but the actuator is not moving the door, with actuator power, ground, or mechanical issues being the most likely causes. Verification at the actuator identifies the fault.

27. A — Failed mode door actuator stuck in defrost position. Defrost works while vent and floor modes don't indicates the mode door is stuck in the defrost position, with actuator failure being the most common cause. Other components would affect more functions than just the mode door positions.
28. C — Clean and inspect the connector and verify motor operation. Intermittent blower operation with corroded connector points to the connector as the cause, with cleaning and inspection being the appropriate first action before motor replacement. Connector corrosion is a common cause of intermittent electrical faults.
29. D — Verify actuator power, ground, and movement at the door. Recirculation door not changing with varying commands indicates the actuator is not responding to commands, with power, ground, or mechanical issues being the most likely causes. Verification at the actuator before component replacement is the proper sequence.
30. A — Software calibration issues from the reflash affecting HVAC control. Erratic HVAC behavior immediately following body controller reflash points to the software update, with calibration issues being a specific fault produced by software changes. Reverification of calibration data resolves this fault.
31. A — Loose or corroded power supply or ground at the HVAC controller. Multiple actuator codes without recent service point to a common-element fault affecting the HVAC system, with power supply or ground at the controller being the most likely cause. Individual actuator failures rarely produce simultaneous codes.
32. D — Verify cabin air filter condition and ductwork for restrictions. Inadequate airflow with normal blower operation points to airflow restriction between the blower and the cabin, with cabin air filter and ductwork being the most common restriction points. The motor operation rules out blower-side faults.
33. B — Verify power supply and control circuit at the auxiliary HVAC system. Auxiliary HVAC failure with normal battery condition points to the auxiliary system itself or its control circuit, with power supply and control circuit verification being the appropriate first diagnostic step. Battery condition rules out the supply source.
34. C — Excessive temperature or moisture in the actuator location. Repeated actuator failures with OEM parts point to environmental conditions affecting actuator life, with excessive temperature or moisture being the most common environmental causes. Identifying the environmental cause and correcting it provides lasting resolution.
35. D — Verify cabin temperature sensor signal and controller calibration. Cabin temperature not matching setpoint with functional ATC system indicates a sensor or calibration issue, with sensor signal verification and calibration check being the appropriate diagnostic steps. Component replacement before verification is premature.

36. A — Loose or corroded J1939 bus connection at the HVAC controller. Intermittent J1939 communication faults at the HVAC controller point to the bus connection at that location, with loose or corroded connections being the most common cause of intermittent communication. Connection inspection and repair resolves this fault.
37. C — Recover the refrigerant for recycling or proper disposal. R-134a with 5% air contamination exceeds the 2% maximum for direct reuse, requiring recovery for recycling or proper disposal per EPA regulations. Direct reuse of contaminated refrigerant damages A/C systems; venting is illegal.
38. B — Recover and dispose of the contaminated refrigerant. Mixed R-134a and R-1234yf refrigerants cannot be recycled or reused — the contamination is too significant and the refrigerants are incompatible. Recovery and disposal per EPA regulations is the only legal option.
39. A — Use a refrigerant identifier to determine the contents before any handling. Unknown refrigerant cylinders require identification before handling because contamination, mixing, or unknown refrigerant types create safety and equipment damage risks. Identification provides the information needed for proper handling decisions.
40. D — EPA Section 609 certification. EPA Section 609 certification is required for technicians who service motor vehicle air conditioning systems, including heavy-duty trucks containing R-134a or R-1234yf. Other certifications cover different equipment types and do not apply to motor vehicle AC.