PRACTICE EXAM 5: T7 SIMULATION (40 QUESTIONS)

1. EPA Section 609 certification is required for technicians who:

A. Service motor vehicle A/C systems

B. Service heavy-duty truck cooling systems

C. Service heavy-duty truck heating systems

D. Service heavy-duty truck electrical systems

2. SAE J639 specifies safety standards for:

A. Heavy-duty truck data networks

B. Heavy-duty truck lighting systems

C. Motor vehicle A/C systems

D. Heavy-duty truck battery specifications

3. Tech A says R-134a refrigerant has a global warming potential (GWP) of approximately 1,430. Tech B says R-1234yf has a GWP of less than 1, making it the preferred refrigerant for new vehicles. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

4. Per OEM service procedures, the proper procedure for verifying refrigerant charge on a heavy-duty truck A/C system is:

A. Visual inspection of the sight glass only

B. Recovery and weight measurement against OEM specification

C. Pressure measurement at idle only

D. Temperature measurement at the evaporator outlet only

5. TMC Recommended Practice for heavy-duty truck A/C system inspection includes:

A. Visual inspection plus performance testing at scheduled PM intervals

B. Pressure measurement only when complaints reported

C. Component replacement at fixed mileage intervals

D. Temperature testing only at scheduled PM intervals

6. Tech A says SAE J2196 covers heavy-duty truck refrigerant retrofit procedures. Tech B says retrofit from R-12 to R-134a requires component compatibility verification. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

7. Per EPA regulations, the maximum allowable refrigerant venting during service is:

A. 1 pound per service event

B. 0.5 pounds for accidental losses

C. None — all refrigerant must be recovered

D. 2 pounds for de minimis releases

8. The proper procedure for evacuation of a heavy-duty truck A/C system per OEM service procedures is:

A. Evacuate to 20 inches Hg for 5 minutes

B. Evacuate to 29 inches Hg or higher for 30 minutes minimum

C. Evacuate to atmospheric pressure for any duration

D. Evacuate using the compressor as a vacuum pump

9. Tech A says A/C system flushing is required after a compressor failure. Tech B says flushing prevents contamination from damaging the new compressor. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

10. Per OEM service procedures, the recommended A/C system PM inspection includes:

A. Refrigerant identifier testing only

B. Pressure measurement only

C. Visual inspection only

D. Visual inspection, performance testing, and leak inspection

11. The proper handling of refrigerant cylinders per DOT regulations requires:

A. Storage at any orientation in the shop

B. Disposal of empty cylinders without recovery

C. Approved cylinders, proper labeling, and secure storage

D. Marking cylinders with shop identification only

12. Tech A says modern heavy-duty truck A/C systems require specific oil types matched to the refrigerant. Tech B says using incorrect oil can damage compressor seals and reduce system life. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

13. Per OEM specifications, the recommended A/C system charging procedure on a heavy-duty truck is:

A. Charge through the high-side service port only

B. Charge through the low-side service port only

C. Charge as liquid through the high-side with the engine off

D. Charge by weight per OEM specification using approved equipment

14. SAE standards for heavy-duty truck A/C system service ports specify:

A. Same size for high and low sides for technician convenience

B. Different sizes for high and low sides to prevent cross-connection

C. Color-coded ports without size differences

D. No size standardization across manufacturers

15. Tech A says heavy-duty truck A/C system leak testing should use electronic leak detectors or UV dye. Tech B says soap solution testing is acceptable for verifying repair completion. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

16. Per EPA regulations, refrigerant recovery equipment must be:

A. Manufacturer-certified for any refrigerant type

B. ASTM-certified for industrial use

C. SAE-certified for automotive use only

D. EPA-certified for the specific refrigerant being recovered

17. TMC Recommended Practice for heavy-duty diesel cooling system inspection specifies:

A. Visual inspection only at every PM

B. Component replacement at fixed mileage intervals

C. Coolant testing, visual inspection, and pressure testing at scheduled intervals

D. Pressure testing only when complaints reported

18. Per OEM service procedures, the proper coolant replacement interval for extended-life coolant (ELC) is:

A. 50,000 miles or 1 year

B. Per OEM specification, often 600,000 miles or 6 years

C. 100,000 miles or 2 years

D. 30,000 miles or 6 months

19. Tech A says heavy-duty diesel cooling systems require specific coolant types per OEM specification. Tech B says mixing different coolant types can produce gel formation and component damage. Who is correct?

A. Tech A only

B. Tech B only

C. Neither Tech A nor Tech B

D. Both Tech A and Tech B

20. Per TMC RP, the recommended SCA testing interval for heavy-duty truck cooling systems is:

A. At every PM service or per OEM specification

B. Only when overheating complaints reported

C. Only at coolant replacement events

D. Annually regardless of mileage

21. Per OEM service procedures, the proper procedure for cooling system pressure testing is:

A. Pressurize to 50 psi above operating pressure

B. Pressurize to OEM-specified test pressure and observe for leaks

C. Pressurize to atmospheric pressure only

D. Pressurize the system through the radiator drain port

22. Tech A says heavy-duty truck cooling system thermostats should be replaced at coolant replacement service. Tech B says thermostats can be reused if testing confirms proper operation. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

23. Per TMC RP, the proper procedure for filling a heavy-duty truck cooling system is:

A. Fill rapidly through the radiator cap

B. Fill rapidly through the surge tank

C. Fill slowly with proper bleed procedure to remove air

D. Fill while the engine is at operating temperature

24. The recommended cooling system flush procedure per OEM specifications includes:

A. Reverse-flushing with water at high pressure

B. Forward-flushing with water at high pressure only

C. Chemical flushing without water rinse

D. Drain, refill with cleaner, run, drain, and refill with proper coolant

25. Per OEM service procedures, the proper diagnostic approach for HVAC actuator faults on a multiplexed truck is:

A. Use a scan tool to verify commands and feedback at the actuator

B. Replace the actuator without diagnostic verification

C. Disconnect the battery to reset the system

D. Replace the body controller as the most likely cause

26. SAE J1939 specification for heavy-duty truck data networks operates at:

A. 100 kbps

B. 500 kbps

C. 250 kbps

D. 1 Mbps

27. Tech A says heavy-duty truck HVAC controllers communicate with the body controller over the J1939 bus on multiplexed systems. Tech B says fault codes from HVAC modules are accessible through the J1939 scan tool interface. Who is correct?

A. Tech A only

B. Both Tech A and Tech B

C. Tech B only

D. Neither Tech A nor Tech B

28. Per OEM service procedures, the proper procedure for replacing an HVAC actuator includes:

A. Direct plug-and-play installation with no programming

B. Disconnecting the battery before installation only

C. Reflashing the body controller after installation only

D. Installation, calibration, and verification of operation through scan tool

29. The recommended PM inspection for heavy-duty truck HVAC systems includes:

A. Filter inspection, performance testing, and fault code retrieval

B. Filter replacement only at every PM

C. Component replacement at fixed mileage intervals

D. Visual inspection only

30. Tech A says heavy-duty truck cabin air filters should be inspected at every PM service. Tech B says cabin air filter replacement intervals depend on operating environment. Who is correct?

A. Tech A only

B. Tech B only

C. Both Tech A and Tech B

D. Neither Tech A nor Tech B

31. Per OEM specifications, the proper diagnostic procedure for blower motor speed faults on a multiplexed truck is:

A. Replace the blower motor as the primary cause

B. Replace the body controller as the primary cause

C. Disconnect the battery to reset the speed control

D. Verify control commands, power, and ground at the motor

32. The proper diagnostic procedure for HVAC system communication faults on a heavy-duty truck is:

A. Replace the HVAC controller as the most likely cause

B. Verify J1939 bus integrity, controller power, and ground connections

C. Replace the body controller as the most likely cause

D. Disconnect the battery to reset the network

33. Tech A says heavy-duty truck HVAC controllers may include diagnostic LEDs for fault status. Tech B says LED indicators provide initial diagnostic information before scan tool connection. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

34. Per OEM service procedures, the recommended HVAC system performance test includes:

A. Visual inspection only at idle

B. Pressure testing only at idle

C. Performance testing at multiple engine RPMs and ambient conditions

D. Component replacement testing at scheduled intervals

35. The proper diagnostic procedure for ATC (Automatic Temperature Control) calibration faults is:

A. Replace the ATC controller as the primary cause

B. Replace the cabin temperature sensor as the primary cause

C. Replace the blend door actuator as the primary cause

D. Verify sensor signals, actuator feedback, and controller calibration

36. Per OEM service procedures, the recommended sleeper auxiliary HVAC system inspection includes:

A. Power supply, control circuit, and performance verification

B. Visual inspection only at every PM

C. Component replacement at fixed mileage intervals

D. Pressure testing only when complaints reported

37. Per EPA Section 609 regulations, refrigerant recovery equipment for motor vehicle A/C service must:

A. Be capable of recovering at any rate

B. Recover refrigerant only when leaks are identified

C. Meet SAE J2788 standards for R-134a recovery efficiency

D. Recover refrigerant only when systems are intentionally vented

38. The proper procedure for storing recovered refrigerant per DOT and EPA regulations is:

A. Any sealed container that prevents leakage

B. DOT-approved cylinders with proper labeling and secure storage

C. Pressurized containers with vented caps

D. Open-top containers stored vertically

39. Tech A says heavy-duty truck shops must maintain records of refrigerant recovery activities per EPA regulations. Tech B says EPA records must include refrigerant type, quantity, and disposal disposition. Who is correct?

A. Both Tech A and Tech B

B. Tech A only

C. Tech B only

D. Neither Tech A nor Tech B

40. Per EPA regulations, the minimum recovery efficiency for R-134a recovery equipment is:

A. 80% per SAE J2788 standard

B. 70% per SAE J2788 standard

C. 90% per SAE J2788 standard

D. 95% per SAE J2788 standard

PRACTICE EXAM 5: ANSWER KEY AND EXPLANATIONS

1. A — Service motor vehicle A/C systems. EPA Section 609 certification is required for technicians who service motor vehicle A/C systems, including heavy-duty trucks. The certification ensures technicians understand proper refrigerant handling, recovery procedures, and EPA compliance requirements.

2. C — Motor vehicle A/C systems. SAE J639 specifies safety standards for motor vehicle A/C systems, covering refrigerant containment, hose specifications, service port standards, and other safety-related requirements. Other SAE standards cover different vehicle subsystems.

3. D — Both Tech A and Tech B. R-134a refrigerant has a global warming potential (GWP) of approximately 1,430, which led to regulatory action requiring transition to lower-GWP alternatives. R-1234yf has a GWP of less than 1, making it the preferred refrigerant for new vehicles under current environmental regulations.

4. B — Recovery and weight measurement against OEM specification. Refrigerant charge verification requires recovery and weight measurement against OEM specification, providing accurate quantitative determination of charge level. Visual, pressure, and temperature methods are not adequate for accurate charge verification.

5. A — Visual inspection plus performance testing at scheduled PM intervals. TMC RP for heavy-duty A/C system inspection specifies visual inspection plus performance testing at scheduled PM intervals, identifying developing issues before failures. Complaint-driven inspection alone misses developing issues.

6. D — Both Tech A and Tech B. SAE J2196 covers heavy-duty truck refrigerant retrofit procedures, providing standardized methods for converting legacy R-12 systems to R-134a operation. Retrofit requires component compatibility verification because R-134a uses different lubricants and seals than R-12.

7. C — None — all refrigerant must be recovered. EPA regulations prohibit refrigerant venting; all refrigerant must be recovered using certified equipment regardless of quantity. Even small amounts of refrigerant venting are violations subject to enforcement action.

8. B — Evacuate to 29 inches Hg or higher for 30 minutes minimum. Proper A/C system evacuation requires 29 inches Hg or higher vacuum for 30 minutes minimum, removing moisture and non-condensables from the system. Inadequate evacuation results in moisture-related component damage and reduced cooling performance.

9. A — Both Tech A and Tech B. A/C system flushing is required after a compressor failure to remove metal particles, debris, and contaminated oil from the system. Flushing prevents contamination from damaging the new compressor, which is the most critical step in successful compressor replacement service.

10. D — Visual inspection, performance testing, and leak inspection. Recommended A/C system PM inspection includes visual inspection (component condition), performance testing (cooling output verification), and leak inspection (refrigerant retention verification). This comprehensive approach identifies developing issues across all system aspects.

11. C — Approved cylinders, proper labeling, and secure storage. DOT regulations for refrigerant cylinder handling require approved cylinders with proper labeling and secure storage to prevent damage and unauthorized use. Other approaches do not meet regulatory requirements.

12. A — Both Tech A and Tech B. Modern heavy-duty truck A/C systems require specific oil types matched to the refrigerant (PAG for R-134a, POE for some applications), with the oil being part of the refrigerant cycle. Using incorrect oil can damage compressor seals (incompatibility) and reduce system life through inadequate lubrication.

13. D — Charge by weight per OEM specification using approved equipment. Recommended A/C charging procedure is by weight per OEM specification using approved charging equipment, providing accurate charge level for proper system performance. Other methods do not provide accurate charge verification.

14. B — Different sizes for high and low sides to prevent cross-connection. SAE standards for heavy-duty truck A/C service ports specify different sizes for high and low sides to prevent cross-connection during service. This safety feature prevents accidental connection that could damage equipment or release refrigerant.

15. A — Both Tech A and Tech B. A/C leak testing should use electronic leak detectors or UV dye, providing sensitive and accurate leak identification. Soap solution testing is acceptable for verifying repair completion at specific connections, providing visible verification at the suspected leak location.

16. D — EPA-certified for the specific refrigerant being recovered. EPA regulations require recovery equipment be certified for the specific refrigerant being recovered (R-134a, R-1234yf), since equipment is designed for specific refrigerant chemistry and operating characteristics. Cross-refrigerant use creates contamination and equipment damage risks.

17. C — Coolant testing, visual inspection, and pressure testing at scheduled intervals. TMC RP for heavy-duty diesel cooling system inspection includes coolant testing (chemistry verification), visual inspection (component condition), and pressure testing (leak detection) at scheduled intervals. This comprehensive approach identifies developing issues.

18. B — Per OEM specification, often 600,000 miles or 6 years. Extended-life coolant (ELC) replacement intervals are OEM-specified, typically extending to 600,000 miles or 6 years for heavy-duty truck applications. The exact interval depends on the specific coolant formulation and maintenance protocol.

19. D — Both Tech A and Tech B. Heavy-duty diesel cooling systems require specific coolant types per OEM specification because different coolants have different additive packages and chemistry. Mixing different coolant types can produce gel formation, additive depletion, and component damage from incompatible chemistry interactions.

20. A — At every PM service or per OEM specification. SCA testing should be performed at every PM service or per OEM specification to verify adequate inhibitor concentration. Inhibitor depletion accelerates cylinder liner cavitation and component corrosion, requiring monitoring and replenishment as needed.

21. B — Pressurize to OEM-specified test pressure and observe for leaks. Cooling system pressure testing requires pressurization to OEM-specified test pressure (typically slightly above operating pressure) and observation for leaks. Excessive pressure damages components; inadequate pressure misses smaller leaks.

22. A — Tech A only. Heavy-duty truck cooling system thermostats should be replaced at coolant replacement service as preventive maintenance, since thermostats degrade over time and replacement during coolant service is cost-effective. Tech B is incorrect because reuse risks failure that requires another cooling system service.

23. C — Fill slowly with proper bleed procedure to remove air. Cooling system filling requires slow filling with proper bleed procedure to remove air pockets that would otherwise reduce coolant circulation and heat transfer. Rapid filling and high-temperature filling produce inadequate filling and air entrainment.

24. D — Drain, refill with cleaner, run, drain, and refill with proper coolant. The standard cooling system flush procedure includes drain, refill with cleaning solution, operation to circulate the cleaner, drain, and refill with proper coolant. This sequence removes contamination while ensuring proper coolant chemistry.

25. A — Use a scan tool to verify commands and feedback at the actuator. HVAC actuator fault diagnosis on multiplexed trucks uses a scan tool to verify commands sent from the controller and feedback received from the actuator, isolating whether the fault is in the controller, the network, or the actuator. Component replacement without verification is inefficient.

26. C — 250 kbps. SAE J1939 specifies a 250 kbps data rate for heavy-duty truck data networks, providing the bandwidth needed for engine, transmission, ABS, body control, and HVAC communication. Higher data rates were not adopted due to compatibility requirements.

27. B — Both Tech A and Tech B. Heavy-duty truck HVAC controllers communicate with the body controller over the J1939 bus on multiplexed systems, providing integrated control across vehicle subsystems. HVAC fault codes are accessible through the J1939 scan tool interface, providing detailed diagnostic information for service.

28. D — Installation, calibration, and verification of operation through scan tool. HVAC actuator replacement requires installation, calibration through scan tool, and verification of operation, since modern actuators require calibration data and operation must be verified before returning to service. Plug-and-play installation is not sufficient.

29. A — Filter inspection, performance testing, and fault code retrieval. Recommended HVAC system PM inspection includes filter inspection (airflow verification), performance testing (cooling and heating output), and fault code retrieval (system status). This comprehensive approach identifies issues across all system aspects.

30. C — Both Tech A and Tech B. Heavy-duty truck cabin air filters should be inspected at every PM service to determine filter condition and replacement need. Cabin air filter replacement intervals depend on operating environment, with dusty or contaminated environments requiring more frequent replacement than clean operating conditions.

31. D — Verify control commands, power, and ground at the motor. Blower motor speed fault diagnosis on multiplexed trucks requires verification of control commands (PWM or relay signals), power supply, and ground at the motor, isolating the cause before component replacement. Random replacement is wasteful.

32. B — Verify J1939 bus integrity, controller power, and ground connections. HVAC system communication fault diagnosis requires verification of J1939 bus integrity (terminating resistors, wiring), controller power supply, and ground connections, isolating the specific fault location. Component replacement without verification is inefficient.

33. A — Both Tech A and Tech B. Heavy-duty truck HVAC controllers may include diagnostic LEDs for fault status, providing immediate visual indication of system condition. LED indicators provide initial diagnostic information before scan tool connection, allowing technicians to assess system status quickly.

34. C — Performance testing at multiple engine RPMs and ambient conditions. Recommended HVAC performance testing requires multiple engine RPMs and ambient conditions to characterize system operation across the operating envelope. Single-condition testing may miss issues that appear only under specific operating conditions.

35. D — Verify sensor signals, actuator feedback, and controller calibration. ATC calibration fault diagnosis requires verification of sensor signals, actuator feedback, and controller calibration to identify the specific cause. Component replacement without verification can leave the actual fault in place while changing components.

36. A — Power supply, control circuit, and performance verification. Recommended sleeper auxiliary HVAC system inspection includes power supply (battery and circuit), control circuit (commands and feedback), and performance verification (cooling and heating output). This comprehensive approach identifies issues across all system aspects.

37. C — Meet SAE J2788 standards for R-134a recovery efficiency. EPA Section 609 regulations require refrigerant recovery equipment for motor vehicle A/C service to meet SAE J2788 standards for R-134a recovery efficiency, ensuring adequate refrigerant capture during service. The standard specifies minimum efficiency requirements.

38. B — DOT-approved cylinders with proper labeling and secure storage. Recovered refrigerant storage requires DOT-approved cylinders with proper labeling (refrigerant type, ownership) and secure storage per DOT and EPA regulations. Other storage methods do not meet regulatory requirements.

39. A — Both Tech A and Tech B. Heavy-duty truck shops must maintain records of refrigerant recovery activities per EPA regulations, providing accountability for refrigerant handling. EPA records must include refrigerant type, quantity, and disposal disposition, allowing regulatory verification of compliance.

40. D — 95% per SAE J2788 standard. The minimum recovery efficiency for R-134a recovery equipment per SAE J2788 standard is 95%, ensuring substantial refrigerant capture during recovery. This high efficiency standard supports EPA regulations on refrigerant containment.