PRACTICE EXAM 4: T7 SIMULATION (40 QUESTIONS)

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1. A 2019 Freightliner Cascadia with 540,000 miles develops poor cab cooling. The compressor was replaced 80,000 miles ago and the system was recharged at that time. Which condition is the most likely cause?

A. Defective replacement compressor from the supplier

B. Failed expansion valve unrelated to compressor service

C. Excessive refrigerant charge from the compressor service

D. Refrigerant loss from accumulated leaks since the last service

2. A Class 8 tractor with 720,000 miles has had repeated A/C compressor clutch failures over the past 200,000 miles. Three different clutch assemblies have been installed without lasting resolution. Which condition is the most likely root cause?

A. Excessive operating pressures or refrigerant cycle issues damaging clutches

B. Defective clutch assemblies from suppliers across multiple deliveries

C. Operator behavior using the A/C system improperly

D. Coincidental failures unrelated to a common cause

3. A 2020 International LT with 280,000 miles has had its A/C system service performed 90 days ago. The driver now reports complete loss of cooling. The most likely cause is:

A. Defective replacement components from the recent service

B. Permanent system damage from the recent service

C. Refrigerant leak that was not identified during the recent service

D. Coincidental compressor failure unrelated to the recent service

4. A 2021 Peterbilt 579 with 180,000 miles develops symptoms of poor cooling and oil residue at the condenser. The driver reports the issue started after a minor frontal accident. The most likely cause is:

A. Defective condenser from manufacturing defect

B. Damaged condenser from the accident impact producing the leak

C. Failed compressor unrelated to the accident

D. Refrigerant overcharge unrelated to the accident

5. A heavy-duty truck has had its A/C condenser replaced 30,000 miles ago. The driver now reports symptoms of high-side over-pressure. Which condition is the most likely cause?

A. Defective replacement condenser from the supplier

B. Permanent damage during condenser replacement service

C. Refrigerant overcharge during the recent service

D. Restricted condenser airflow from accumulated debris in the fins

6. A 2018 Mack Anthem with 620,000 miles develops a complaint of intermittent A/C compressor cycling. The system has had no recent service. The most likely cause is:

A. Marginal refrigerant charge from accumulated minor leaks over time

B. Failed compressor clutch from accumulated wear

C. Failed expansion valve from accumulated wear

D. Failed body controller from accumulated electrical wear

7. A Class 8 tractor with 940,000 miles has had three different compressor brands installed over its service life. The driver reports the most recent compressor produces noise during operation. Which diagnostic step is most appropriate?

A. Replace the compressor with another different brand

B. Replace the compressor with the original OEM brand

C. Verify refrigerant charge level and oil level before further action

D. Replace the entire A/C system as a complete assembly

8. A heavy-duty truck has had its A/C system flushed 50,000 miles ago after a compressor failure. The driver now reports gradual cooling degradation. The most likely cause is:

A. Defective replacement components from the compressor service

B. Inadequate flushing leaving contamination in the system

C. Refrigerant overcharge during the recent service

D. Operator behavior shortening system life since the service

9. A 2019 Volvo VNL with 380,000 miles has had its A/C compressor replaced 5,000 miles ago after a bearing failure. The driver now reports a similar bearing noise from the new compressor. Which condition is the most likely cause?

A. Defective replacement compressor from the supplier

B. Drive belt tension excessive damaging the new compressor

C. Mounting hardware not properly torqued during installation

D. Inadequate flushing leaving contamination in the new compressor

10. A heavy-duty truck driver reports that the A/C operates normally for the first 30 minutes of operation but cooling degrades during continued use. Which condition is the most likely cause?

A. Restricted condenser airflow becoming progressive with heat soak

B. Failed compressor clutch with thermal failure pattern

C. Excessive refrigerant charge causing thermal cycling

D. Failed expansion valve with thermal binding pattern

11. A 2022 Kenworth T680 with 95,000 miles develops a complaint of A/C system intermittent operation. The truck has had no service. Which condition is LEAST likely the cause?

A. Marginal refrigerant charge causing pressure switch cycling

B. Worn compressor with reduced output capacity

C. Failed pressure switch with intermittent operation

D. Failed body controller with intermittent commands

12. A heavy-duty truck has had its A/C system serviced for refrigerant leak repair 3 months ago. The driver now reports the same symptoms returning. The most likely cause is:

A. Defective replacement components from the leak repair

B. Permanent damage during the leak repair service

C. Operator behavior creating new leaks since the service

D. The original leak source was not properly identified or repaired

13. A 2017 Freightliner Cascadia with 1.1 million miles has had its A/C system completely replaced 200,000 miles ago. The driver now reports symptoms of poor cooling. Which condition is the most likely cause?

A. Normal wear and refrigerant loss after high mileage on the replacement system

B. Defective replacement components from the original installation

C. Permanent damage during the original installation

D. Operator behavior shortening system life

14. A heavy-duty truck has had its A/C compressor replaced 25,000 miles ago. The driver now reports the compressor clutch engages but no cooling occurs. The most likely cause is:

A. Defective replacement compressor from the supplier

B. Permanent damage during compressor replacement

C. Inadequate refrigerant charge during the recent service

D. Operator behavior shortening compressor life

15. A 2020 Peterbilt 579 with 220,000 miles has had repeated condenser failures every 18 months. The fleet has used the same condenser brand throughout. Which condition is the most likely root cause?

A. Defective condensers from the supplier across multiple deliveries

B. Operator behavior shortening condenser life

C. Vibration damage from chassis flex affecting the condenser

D. Stone or debris damage from operating environment affecting condensers

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

A. Defective replacement receiver-drier from the supplier

B. Inadequate evacuation during the recent service

C. Excessive refrigerant charge during the recent service

D. Operator behavior creating moisture intrusion

17. A 2018 Kenworth T680 with 640,000 miles has had its engine thermostat replaced 40,000 miles ago. The driver now reports overheating symptoms. Which condition is the most likely cause?

A. Coolant level deterioration since the thermostat service

B. Defective replacement thermostat from the supplier

C. Permanent engine damage during the thermostat service

D. Failed water pump unrelated to the thermostat service

18. A heavy-duty truck has had its radiator replaced 100,000 miles ago after stone damage. The driver now reports symptoms of overheating during high-load operation. Which condition is the most likely cause?

A. Defective replacement radiator from the supplier

B. Permanent engine damage during the radiator service

C. Operator behavior shortening radiator life

D. Restricted radiator from accumulated debris in the fins or core

19. A 2020 Peterbilt 579 with 360,000 miles has had its coolant replaced 50,000 miles ago. The driver now reports symptoms of cylinder liner cavitation damage. Which condition is the most likely cause?

A. Defective replacement coolant from the supplier

B. Inadequate coolant level since the service

C. Inadequate supplemental coolant additive (SCA) levels in the new coolant

D. Operator behavior causing cavitation conditions

20. A heavy-duty truck has had its water pump replaced 75,000 miles ago. The driver now reports symptoms of coolant leak from the water pump area. Which condition is the most likely cause?

A. Defective replacement water pump from the supplier

B. Improper installation or damaged seal during replacement

C. Operator behavior damaging the water pump

D. Coolant contamination shortening water pump life

21. A 2017 Mack Anthem with 880,000 miles has had three different cooling system services over its life. The driver reports the most recent service produced inadequate cooling. Which condition is the most likely cause?

A. Air not properly bled from the cooling system after the recent service

B. Defective replacement components from the recent service

C. Permanent engine damage during the recent service

D. Operator behavior shortening cooling system life

22. A heavy-duty truck has had its cooling system pressure-tested 30,000 miles ago after a coolant loss complaint. The driver now reports recurring coolant loss. Which condition is the most likely cause?

A. Defective replacement components from the recent service

B. Permanent engine damage during the recent pressure test

C. Internal leak (head gasket or similar) not identified during the previous test

D. Operator behavior creating new leaks since the recent test

23. A 2021 Volvo VNL with 120,000 miles has had its engine cooling fan clutch replaced 6 months ago. The driver now reports symptoms of overheating during high-load operation. Which condition is the most likely cause?

A. Defective replacement fan clutch from the supplier

B. Permanent engine damage during fan clutch service

C. Operator behavior shortening fan clutch life

D. Fan clutch control circuit fault not addressed during replacement

24. A heavy-duty truck has had repeated thermostat failures over the past 200,000 miles. The fleet has used the same thermostat brand throughout. Which condition is the most likely root cause?

A. Defective thermostats from the supplier across multiple deliveries

B. Coolant condition or contamination affecting thermostat life

C. Operator behavior shortening thermostat life

D. Coincidental failures unrelated to a common cause

25. A 2019 Peterbilt 579 with 380,000 miles has had its blower motor replaced 5,000 miles ago. The driver now reports the blower operates only at high speed. Which condition is the most likely cause?

A. Failed blower resistor unrelated to motor replacement

B. Defective replacement blower motor from the supplier

C. Permanent damage during blower motor replacement

D. Operator behavior shortening blower resistor life

26. A heavy-duty truck has had its HVAC actuator replaced 20,000 miles ago. The driver now reports symptoms of incorrect mode operation. Which condition is the most likely cause?

A. Defective replacement actuator from the supplier

B. Permanent damage during actuator replacement

C. Improper actuator calibration after replacement service

D. Operator behavior damaging the actuator

27. A 2020 Kenworth T680 with 240,000 miles has had its body controller replaced 10,000 miles ago. The driver now reports symptoms of erratic HVAC operation. Which condition is the most likely cause?

A. Defective replacement body controller from the supplier

B. Body controller programming or configuration not completed properly after replacement

C. Permanent damage during body controller replacement

D. Operator behavior shortening body controller life

28. A heavy-duty truck has had its cabin air filter replaced 3 months ago. The driver now reports symptoms of inadequate airflow. Which condition is the most likely cause?

A. Defective replacement filter from the supplier

B. Permanent damage during filter replacement

C. Operator behavior damaging the filter housing

D. Heavy contamination already restricting the new filter at high mileage

29. A 2018 Volvo VNL with 720,000 miles has had repeated HVAC actuator failures over its service life. The fleet has used the same actuator brand throughout. Which condition is the most likely root cause?

A. Excessive heat or moisture in the actuator location affecting all actuators

B. Defective actuators from the supplier across multiple deliveries

C. Operator behavior shortening actuator life

D. Coincidental failures unrelated to a common cause

30. A heavy-duty truck has had its HVAC control panel replaced 15,000 miles ago. The driver now reports symptoms of intermittent HVAC operation. Which condition is the most likely cause?

A. Defective replacement control panel from the supplier

B. Permanent damage during control panel replacement

C. Loose or corroded connector at the control panel from installation

D. Operator behavior shortening control panel life

31. A 2021 Freightliner Cascadia with 140,000 miles has had its sleeper auxiliary HVAC system installed 50,000 miles ago. The driver now reports the system fails to operate during engine-off periods. Which condition is the most likely cause?

A. Defective sleeper HVAC system from the supplier

B. Permanent damage during installation

C. Operator behavior shortening system life

D. Sleeper battery condition or auxiliary power circuit fault

32. A heavy-duty truck has had its HVAC system serviced for blend door issues 6 months ago. The driver now reports recurring blend door symptoms. The most likely cause is:

A. Defective replacement components from the recent service

B. Underlying mechanical or wiring issue not addressed during the recent service

C. Permanent damage during the recent service

D. Operator behavior creating new symptoms

33. A 2017 Mack Anthem with 940,000 miles has had its blower motor replaced three times over its service life. The driver reports the most recent blower motor produces noise during operation. Which condition is the most likely cause?

A. Inadequate motor cooling due to airflow restriction or filter condition

B. Defective replacement motor from the supplier

C. Permanent damage during the recent installation

D. Operator behavior shortening blower motor life

34. A heavy-duty truck driver reports that the dash HVAC display freezes intermittently and recovers after a few seconds. The truck has had no recent service. Which condition is the most likely cause?

A. Failed HVAC controller producing erratic display

B. Failed body controller producing erratic display

C. Loose or corroded power supply or ground at the HVAC controller

D. J1939 bus issues affecting all dash displays

35. A 2020 Peterbilt 579 with 260,000 miles has had its temperature blend door actuator replaced 6 months ago. The driver now reports the blend door operates correctly but cab temperature is incorrect. Which condition is the most likely cause?

A. Defective replacement actuator from the supplier

B. Permanent damage during actuator replacement

C. Operator behavior affecting cab temperature

D. Cabin temperature sensor or controller calibration issue

36. A heavy-duty truck has had its check engine lamp illuminated for 30,000 miles without service action. The driver now reports HVAC issues unrelated to the check engine code. The most likely cause of the HVAC issues is:

A. Direct relationship between the check engine code and HVAC operation

B. Coincidental HVAC issues unrelated to the long-standing engine code

C. Permanent HVAC damage from the unaddressed engine code

D. Common-element fault affecting both engine and HVAC functions

37. A heavy-duty truck shop has received a fleet vehicle requiring A/C service. The previous service shop used a different refrigerant identifier brand than the current shop. The proper procedure is:

A. Use the current shop's identifier to verify refrigerant before service

B. Trust the previous shop's identification documentation without retesting

C. Add fresh refrigerant without testing because the previous shop's identification is recent

D. Recover all refrigerant before identification testing

38. A heavy-duty truck shop has accumulated multiple recovery cylinders from various service events. The proper handling is:

A. Mix refrigerants from all cylinders for general use

B. Vent older refrigerant to atmosphere because it is no longer useful

C. Identify each cylinder's contents and handle per EPA regulations for that refrigerant type

D. Dispose of all cylinders to reduce shop liability

39. A heavy-duty truck shop has discovered a leaking recovery cylinder in storage. The proper response is:

A. Continue using the cylinder until empty

B. Vent the remaining refrigerant to atmosphere and dispose of the cylinder

C. Add additional refrigerant to compensate for the leak

D. Transfer remaining refrigerant to an approved cylinder and dispose of the leaking cylinder per regulations

40. A heavy-duty truck shop technician has discovered that refrigerant from a recovery cylinder produces a refrigerant identifier reading indicating significant contamination. The proper action is:

A. Send the cylinder for recycling or disposal per EPA regulations

B. Use the contaminated refrigerant in older equipment that can tolerate contamination

C. Mix the contaminated refrigerant with pure refrigerant to dilute the contamination

D. Vent the contaminated refrigerant to atmosphere because it cannot be used

PRACTICE EXAM 4: ANSWER KEY AND EXPLANATIONS

1. D — Refrigerant loss from accumulated leaks since the last service. Poor cooling 80,000 miles after compressor service most commonly traces to refrigerant loss from accumulated minor leaks rather than the previous service work. Heavy-duty A/C systems typically lose small amounts of refrigerant over thousands of miles, eventually producing cooling degradation.

2. A — Excessive operating pressures or refrigerant cycle issues damaging clutches. Repeat clutch failures across multiple replacements point to system-side conditions damaging each new clutch, with excessive operating pressures or refrigerant cycle issues being the most common cause. Verifying system operating pressures identifies the underlying issue.

3. C — Refrigerant leak that was not identified during the recent service. Complete cooling loss 90 days after service points to a refrigerant leak that was not identified or properly repaired during the recent service work. Original leak source identification and repair is essential to prevent recurring symptoms.

4. B — Damaged condenser from the accident impact producing the leak. Poor cooling and oil residue at the condenser following frontal accident impact directly implicates accident damage as the cause, with the condenser typically being damaged in front-end impacts due to its forward mounting location. Inspection identifies the specific damage.

5. D — Restricted condenser airflow from accumulated debris in the fins. High-side over-pressure 30,000 miles after condenser replacement most likely traces to restricted condenser airflow from accumulated debris in the fins, since the condenser is exposed to road debris and bug accumulation. Cleaning or replacement may be required.

6. A — Marginal refrigerant charge from accumulated minor leaks over time. Intermittent compressor cycling without recent service points to marginal refrigerant charge from accumulated minor leaks, where the low-pressure switch occasionally cycles based on operating conditions. Verifying charge level identifies this fault.

7. C — Verify refrigerant charge level and oil level before further action. Compressor noise on a recent installation requires verification of refrigerant charge and oil level before condemning the new compressor, since charge and lubrication issues are common causes of post-installation noise. Replacement without verification is wasteful.

8. B — Inadequate flushing leaving contamination in the system. Gradual cooling degradation after compressor replacement with system flush points to inadequate flushing during the previous

service, where contamination remained in the system and gradually affected new component performance. Proper flushing procedure prevents this fault.

9. D — Inadequate flushing leaving contamination in the new compressor. Bearing noise 5,000 miles after compressor replacement points to contamination from the previous failure that was not properly flushed, with metal particles or contamination damaging the new compressor's bearings. Proper flushing is essential after compressor failure.

10. A — Restricted condenser airflow becoming progressive with heat soak. A/C cooling that degrades during continued operation is the classic signature of restricted condenser airflow, where heat builds up and reduces condenser efficiency over time. Initial operation is normal because the condenser starts at ambient temperature.

11. B — Worn compressor with reduced output capacity. The least likely cause of intermittent A/C operation is a worn compressor with reduced output, since worn compressors typically produce gradual capacity loss rather than intermittent operation. The other options (refrigerant charge, pressure switch, body controller) all directly produce intermittent symptoms.

12. D — The original leak source was not properly identified or repaired. Recurring leak symptoms 3 months after leak repair indicate the original leak source was not properly identified or completely repaired during the previous service. Verification of the actual leak source is required for lasting resolution.

13. A — Normal wear and refrigerant loss after high mileage on the replacement system. Poor cooling 200,000 miles after complete system replacement most commonly traces to normal wear and refrigerant loss over the high mileage on the replacement system, with this mileage being typical for refrigerant loss to occur. The original installation is no longer the relevant cause.

14. C — Inadequate refrigerant charge during the recent service. Compressor clutch engaging without cooling 25,000 miles after replacement points to inadequate refrigerant charge during the previous service, with the system having lost charge or having been undercharged at installation. Verifying charge level identifies this fault.

15. D — Stone or debris damage from operating environment affecting condensers. Repeated condenser failures across multiple installations point to environmental damage in the operating area, with stone or debris impact damage being the most common environmental cause. Protection or operating area changes may be required.

16. B — Inadequate evacuation during the recent service. Moisture symptoms 2 weeks after receiver-drier replacement point directly to inadequate evacuation during the previous service, where moisture remained in the system and saturated the new desiccant material. Proper evacuation procedure prevents this fault.

17. A — Coolant level deterioration since the thermostat service. Overheating 40,000 miles after thermostat service most likely traces to coolant level loss from minor leaks or normal evaporation

since the previous service, with verification of coolant level being the appropriate first diagnostic step. Replacement components rarely fail at this interval.

18. D — Restricted radiator from accumulated debris in the fins or core. Overheating during high-load operation 100,000 miles after radiator replacement most commonly traces to accumulated debris in the radiator fins or core, since high-load operation requires maximum cooling capacity. Cleaning or maintenance is typically required.

19. C — Inadequate supplemental coolant additive (SCA) levels in the new coolant. Cylinder liner cavitation damage 50,000 miles after coolant replacement most commonly traces to inadequate SCA levels in the new coolant, with SCA being the protection against cavitation that depletes during operation. Testing and addition of SCA prevents this damage.

20. B — Improper installation or damaged seal during replacement. Coolant leak at the water pump area 75,000 miles after replacement most commonly traces to the previous installation, with improper installation or seal damage being the most common installation faults. Manufacturing defects in water pumps are statistically rare.

21. A — Air not properly bled from the cooling system after the recent service. Inadequate cooling immediately after cooling system service most commonly traces to air not properly bled from the system, with air pockets reducing coolant circulation and heat transfer. Proper bleeding procedure resolves this fault.

22. C — Internal leak (head gasket or similar) not identified during the previous test. Recurring coolant loss 30,000 miles after pressure test indicates an internal leak that did not show up during the previous external pressure test. Cylinder leakage tests and combustion gas tests identify these internal leaks.

23. D — Fan clutch control circuit fault not addressed during replacement. Overheating during high-load operation 6 months after fan clutch replacement points to control circuit issues that were not addressed during the replacement, with electrical or signal issues preventing proper fan engagement under load. Verification of the control circuit is required.

24. B — Coolant condition or contamination affecting thermostat life. Repeated thermostat failures across multiple replacements point to coolant condition or contamination as the underlying cause, with contaminated or improperly maintained coolant accelerating thermostat wear. Coolant analysis identifies the specific issue.

25. A — Failed blower resistor unrelated to motor replacement. Blower operating only at high speed 5,000 miles after motor replacement points to a separate failure (blower resistor) unrelated to the motor service, since high-speed-only operation is the classic resistor failure pattern. The motor replacement is coincidental.

26. C — Improper actuator calibration after replacement service. Incorrect mode operation 20,000 miles after actuator replacement points to improper calibration during the previous service, with

calibration being a critical step that is sometimes missed. Recalibration through scan tool typically resolves this fault.

27. B — Body controller programming or configuration not completed properly after replacement. Erratic HVAC operation 10,000 miles after body controller replacement points to improper programming or configuration during the previous service, with programming being a critical step for multiplexed systems. Verification of programming is required.

28. D — Heavy contamination already restricting the new filter at high mileage. Inadequate airflow 3 months after filter replacement most commonly traces to heavy contamination already restricting the new filter, particularly in high-mileage trucks operating in dusty environments. More frequent filter service may be required.

29. A — Excessive heat or moisture in the actuator location affecting all actuators. Repeated actuator failures across multiple replacements point to environmental conditions affecting actuator life, with excessive heat or moisture being the most common environmental causes. Identifying and addressing the environmental condition provides lasting resolution.

30. C — Loose or corroded connector at the control panel from installation. Intermittent HVAC operation 15,000 miles after control panel replacement points to the installation work, with loose or corroded connector being the most common post-installation issue. Connector inspection and repair resolves this fault.

31. D — Sleeper battery condition or auxiliary power circuit fault. Sleeper auxiliary HVAC failure during engine-off periods most commonly traces to sleeper battery condition or auxiliary power circuit faults, since the system depends on auxiliary power for engine-off operation. Battery testing and circuit verification identify the cause.

32. B — Underlying mechanical or wiring issue not addressed during the recent service. Recurring blend door symptoms 6 months after service indicate an underlying mechanical or wiring issue that was not addressed during the previous service, with the surface symptom being treated rather than the root cause. Comprehensive diagnosis is required.

33. A — Inadequate motor cooling due to airflow restriction or filter condition. Repeated blower motor failures with noise complaints point to inadequate motor cooling, with airflow restriction (filter or ductwork) being the most common cause that shortens motor life. Addressing the airflow issue prevents repeat failures.

34. C — Loose or corroded power supply or ground at the HVAC controller. Intermittent display freezing that recovers on its own is the classic signature of power supply or ground connection issues at the controller, with loose or corroded connections being the most common cause. Verification at the controller identifies the fault.

35. D — Cabin temperature sensor or controller calibration issue. Cab temperature incorrect with proper blend door operation points to the sensor or controller calibration rather than the actuator,

with the sensor providing incorrect input or the controller scaling the input incorrectly. Sensor verification and calibration check is the next diagnostic step.

36. B — Coincidental HVAC issues unrelated to the long-standing engine code. HVAC issues with a long-standing check engine code that is unrelated to HVAC operation indicate coincidental issues, since the engine and HVAC systems are typically independent. Diagnosing each issue separately is the appropriate approach.

37. A — Use the current shop's identifier to verify refrigerant before service. Each shop should use its own refrigerant identifier to verify refrigerant before service, since previous identification documentation may not be current and equipment differences may produce different results. Verification protects against contamination and equipment damage.

38. C — Identify each cylinder's contents and handle per EPA regulations for that refrigerant type. Multiple recovery cylinders should be identified and handled per EPA regulations for each specific refrigerant type, since mixing or improper handling violates regulations and creates safety risks. Each cylinder requires individual identification.

39. D — Transfer remaining refrigerant to an approved cylinder and dispose of the leaking cylinder per regulations. A leaking recovery cylinder requires immediate transfer of remaining refrigerant to an approved cylinder and proper disposal of the leaking cylinder per EPA and DOT regulations. Continued use or venting are not acceptable options.

40. A — Send the cylinder for recycling or disposal per EPA regulations. Significantly contaminated refrigerant must be sent for recycling or disposal per EPA regulations, since contamination prevents safe reuse and dilution does not address contamination concerns. Proper disposal protects equipment and environment.