PRACTICE EXAM 9: ASE T8 PMI SIMULATION

1. A driver reports that the tractor's air conditioning produces cold air for the first 10 minutes of operation, then gradually loses cooling capacity. With A/C turned off for 5 minutes and restarted, the cooling cycle repeats. The most likely cause is:

A. Evaporator core icing from airflow restriction, high humidity, or low refrigerant charge

B. Compressor clutch cycling failure requiring clutch replacement at the service center

C. Expansion valve internal damage producing intermittent refrigerant flow

D. Normal A/C operation in high ambient temperature and humidity conditions

2. The correct procedure for draining water from a commercial vehicle's air reservoir is to:

A. Remove the fill plug on top of the reservoir and allow gravity drainage

B. Pressurize the system to maximum pressure and release through a secondary valve

C. Disconnect the reservoir outlet line and allow the entire volume to drain

D. Operate the manual drain valve at the bottom of the reservoir until only clean air discharges

3. A Class 8 tractor's engine produces a knocking sound that occurs primarily during initial startup and diminishes as the engine warms up. The most likely cause is:

A. Main bearing wear approaching failure threshold requiring immediate service

B. Piston slap from worn piston skirts, reducing as thermal expansion closes clearances

C. Valve train mechanical interference requiring valve cover inspection

D. Connecting rod bearing failure requiring immediate engine shutdown

4. The correct action when a commercial vehicle's trailer brake chamber pushrod shows excessive stroke at the specified test pressure is to:

A. Apply brake system cleaner to the chamber and pushrod to remove accumulated contamination

B. Replace the pushrod return spring to compensate for the excessive stroke measurement

C. Investigate the cause of excessive stroke and make appropriate repairs before return to service

D. Adjust the slack adjuster manually to reduce the stroke within specification

5. A technician inspecting a tractor's rear axle finds the axle housing breather cap is missing. The correct action is to:

A. Install a replacement breather cap of the correct specification and verify axle vent function

B. Continue service since the missing cap allows atmospheric pressure balance in the housing

C. Temporarily cover the breather opening with tape until the next service interval

D. Drain the axle oil to prevent contamination through the open breather

6. The correct interpretation of a diesel engine's oil pressure gauge reading that drops substantially during highway operation at cruise conditions is:

A. Normal oil pressure variation during extended highway operation with sustained engine load

B. Oil pump wear reducing output capacity at elevated flow demand during cruise

C. Low oil level or engine oil aeration during sustained high-flow conditions

D. Engine oil pressure problem requiring diagnostic investigation across the lubrication system

7. A Class 8 tractor exhibits a vibration at highway speeds that changes in character when the driver applies light brake pressure. The vibration reduces under braking. The most likely cause is:

A. Engine mount deterioration producing vibration transferred through the frame

B. Wheel bearing wear at the rear axle causing speed-dependent vibration

C. Driveline imbalance at the rear axle producing vibration from rotational forces

D. Normal vibration that is absorbed through the brake system during application

8. The correct procedure for checking a commercial vehicle's brake lining thickness is to:

A. Visual estimation through the brake inspection window at the wheel

B. Feeler gauge measurement between the brake lining and the drum or rotor

C. Direct measurement with a brake lining depth gauge or ruler from the friction surface to the backing plate

D. Comparison of lining thickness between left and right sides of the axle

9. A driver reports that the steering wheel oscillates (shakes) at specific highway speeds, with the oscillation becoming worse at higher speeds. The most likely cause is:

A. Front tire or wheel imbalance producing speed-dependent oscillation in the steering wheel

B. Power steering system fluid aeration at elevated operating speeds

C. Steering gear box internal wear producing play during highway operation

D. Normal steering wheel vibration from road surface characteristics at highway speeds

10. The correct method for inspecting a commercial vehicle's leaf spring bundle is to:

A. Remove the spring assembly from the vehicle for bench inspection

B. Measure spring height at each position to verify specification

C. Apply hydraulic pressure to test spring rate and compare to specification

D. Visual inspection for broken leaves, cracks, shifted leaves, and missing or damaged shackles

11. The primary purpose of a commercial vehicle's spring brake modulating valve is to:

A. Regulate air pressure delivered to the service brake chambers during application

B. Control the rate of spring brake application during emergency release of air pressure

C. Filter contamination from the spring brake circuit during normal operation

D. Provide graduated (modulated) release of spring brakes during emergency air loss conditions

12. A technician performing PMI finds a diesel engine's coolant with a brown color and floating particulate matter. The most likely cause is:

A. Normal coolant discoloration from extended service life in the system

B. Coolant contamination from system corrosion or chemistry degradation requiring flush and refill

C. Oil contamination from a failed heat exchanger or oil cooler gasket

D. Excessive supplemental coolant additive (SCA) producing particulate precipitation

13. The correct interpretation of a commercial vehicle's steering system that produces a groaning sound during full steering input is:

A. Low power steering fluid level, aerated fluid, or pump wear producing the sound under load

B. Normal power steering sound during maximum steering angle conditions

C. Steering gear box internal damage requiring immediate service

D. Tire scrubbing during maximum steering angle producing the audible sound

14. A Class 8 tractor's air brake system shows a pressure drop of 5 psi per minute during a tractor-trailer leak test with service brakes applied. The specification is:

A. Within specification — a maximum of 6 psi per minute is allowed with brakes applied

B. Marginal — the vehicle is at the upper limit of acceptable leakage

C. Excessive leakage — 3 psi per minute is the specification for this test

D. Excessive leakage — 4 psi per minute maximum is specified for this test condition

15. The correct procedure for verifying a commercial vehicle's engine crankcase ventilation (CCV) system function is to:

A. Remove the CCV filter and inspect for accumulated oil and contamination

B. Measure intake manifold vacuum with the engine running at idle

C. Check for proper flow through the CCV system, absence of oil pushing at seals, and condition of the CCV filter element

D. Replace the CCV filter regardless of current condition at each annual service

16. A technician inspecting a trailer finds the mud flaps mounted at the rear of the trailer have multiple large tears and gaps. The correct action is:

A. Replace the damaged mud flaps before the vehicle returns to service

B. Continue service since mud flaps are not essential safety equipment

C. Apply duct tape to close the major gaps in the damaged areas

D. Remove the mud flaps entirely since damaged flaps provide no benefit

17. The correct diagnostic approach when a driver reports the vehicle's engine produces a puff of black smoke each time the accelerator is depressed quickly is to:

A. Increase the fuel filter replacement frequency at the next service interval

B. Perform comprehensive engine tune-up including fuel system components

C. Adjust the engine idle speed to reduce smoke during acceleration events

D. Investigate for air intake restriction, turbocharger lag, or injector problems producing rich mixture during acceleration

18. A commercial vehicle's radiator coolant cap pressure rating must match the specification to:

A. Provide adequate coolant flow through the radiator during normal operation

B. Maintain system pressure that raises the coolant boiling point above normal operating temperature

C. Prevent coolant leakage at the radiator cap seal during pressure cycles

D. Control the volume of coolant transferred to the overflow reservoir during expansion

19. The correct procedure for testing a commercial vehicle's engine cooling fan clutch (viscous type) is to:

A. Measure fan speed relative to engine speed using a tachometer during operation

B. Disconnect the fan clutch and test under laboratory conditions at a service center

C. Visual inspection of the clutch for fluid leakage, unusual sound, and temperature response during warm-up

D. Replace the fan clutch at every 100,000 miles as preventive maintenance

20. A Class 8 tractor's driver reports that the exhaust produces visible water droplets at the exhaust outlet during cold-weather operation. The vehicle appears to be operating normally. The most likely interpretation is:

A. Normal condensation in the exhaust system during cold-weather operation — no service action required

B. Coolant leak into the combustion chambers producing water in the exhaust

C. Incomplete combustion from cold fuel temperature producing fuel-water mixture in exhaust

D. Exhaust system damage allowing rain water to enter the exhaust path

21. The correct response when a commercial vehicle's air brake chamber return spring appears bent or damaged is:

A. Apply heat and straighten the spring to its original shape

B. Replace the brake chamber assembly, since spring replacement alone is not approved

C. Monitor the spring condition at the next service interval

D. Reposition the spring within the chamber housing for acceptable operation

22. A technician performing PMI finds that the steering column U-joint shows visible wear with audible clicking during steering input. The correct action is:

A. Apply grease to the U-joint to reduce the wear progression

B. Adjust the steering column position to reduce load on the worn U-joint

C. Replace the worn steering column U-joint before returning the vehicle to service

D. Continue service with documentation for monitoring at the next interval

23. The primary purpose of a commercial vehicle's master cylinder reservoir cap vent is to:

A. Prevent contamination from entering the brake fluid during normal operation

B. Allow rapid refilling of the reservoir during brake service procedures

C. Allow atmospheric pressure equalization as fluid level changes with pad wear and temperature

D. Provide visual indication of fluid level during routine inspection

24. A Class 8 tractor exhibits hesitation and stalling during acceleration from a stop, with normal operation at cruise speeds. The most likely cause is:

A. Normal behavior during cold-weather startup and initial operation

B. Engine idle speed below manufacturer specification causing stumble during throttle input

C. Worn clutch friction material affecting initial engagement

D. Fuel delivery problem: clogged filter, fuel pressure problem, or air in fuel system affecting low-speed operation

25. The correct procedure for checking a commercial vehicle's brake hose condition is to:

A. Inspect for cracks, bulges, chafing, fluid leakage, and secure mounting at both ends

B. Remove and disassemble each brake hose for internal inspection

C. Pressurize each hose to maximum system pressure and measure dimension changes

D. Replace all brake hoses at intervals specified by hose manufacturer

26. A driver reports that the vehicle's fuel gauge reads below full when the fuel tanks have just been filled to capacity. The most likely cause is:

A. Driver error in interpreting the fuel gauge reading during operation

B. Fuel tank sending unit failure or wiring problem producing incorrect signal to the gauge

C. Fuel gauge assembly failure requiring immediate replacement

D. Normal variation in fuel gauge readings due to fuel movement in the tanks

27. The correct interpretation of a commercial vehicle's turbocharger that produces a whining sound that changes pitch with engine load is:

A. Normal turbocharger operation across the load range of the engine

B. Wastegate malfunction affecting boost pressure regulation during operation

C. Exhaust leak before the turbocharger producing variable sound with load

D. Turbocharger bearing wear producing load-dependent noise requiring service evaluation

28. A Class 8 tractor's rear brakes show uneven wear, with the left side lining thinner than the right side at the same axle position. The vehicle has not been in any crash events. The most likely cause is:

A. Normal wear variation between left and right sides of the same axle

B. Driver braking patterns producing preferential wear on one side

C. Brake imbalance: dragging brake, stuck slack adjuster, or contaminated lining on the worn side

D. Incorrect brake lining material installed on the worn side during previous service

29. The correct procedure for testing a commercial vehicle's ABS system function is to:

A. Apply maximum brake pressure during a road test to verify ABS activation

B. Connect a scan tool compatible with the vehicle's ABS system and check for stored fault codes

C. Visual inspection of ABS warning lamps during key-on prove-out cycle only

D. Measure voltage at each wheel speed sensor during vehicle operation

30. A driver reports that the steering wheel has developed significant free play — the wheel can be turned 2 inches in either direction before the front tires respond. The most likely cause is:

A. Normal steering system wear at the age and mileage of the vehicle

B. Incorrect steering alignment requiring realignment at a service center

C. Low power steering fluid producing delayed steering response

D. Steering gear box wear, worn drag link, pitman arm, or tie rod ends producing excessive play

31. The correct action when a commercial vehicle's alternator produces an unusual whining sound during operation is:

A. Test the alternator for bearing condition, rotor balance, and belt tension before replacing

B. Replace the alternator drive belt and verify tension specification

C. Apply lubricant to the alternator bearings through the grease fittings

D. Replace the alternator assembly as preventive maintenance regardless of diagnostic results

32. A Class 8 tractor's coolant exhibits oil contamination discovered during PMI. The engine has been operating normally with no driver complaints of performance issues. The correct response is:

A. Drain and refill the coolant system with fresh coolant and continue service

B. Add an oil-removing additive to the coolant to eliminate the contamination

C. Monitor the contamination level at the next service interval

D. Investigate the source of oil contamination before continuing operation

33. The correct procedure for inspecting a commercial vehicle's fifth wheel pivot is to:

A. Apply grease to the pivot and verify smooth rotation through the full range

B. Check for excessive movement, wear, and proper lubrication at the pivot bearing surfaces

C. Replace the pivot bearing at each annual inspection as preventive maintenance

D. Measure pivot angular tolerance with a precision instrument at each service

34. A technician inspecting a tractor finds that the driver's seat belt retractor does not automatically retract when the belt is released from the buckle. The correct action is:

A. Replace the damaged seat belt retractor assembly before the vehicle returns to service

B. Apply lubricant to the retractor mechanism to restore automatic retraction function

C. Continue service if the belt still provides protection when manually adjusted

D. Adjust the retractor tension with manufacturer service tools to restore function

35. The correct interpretation of a commercial vehicle's parking brake warning light that remains illuminated after the parking brake is released is:

A. Normal warning light operation during the first 30 seconds after parking brake release

B. Bulb test cycle extending beyond normal parameters for the vehicle's age

C. Driver error in fully releasing the parking brake control at the dashboard

D. Parking brake not fully released, failed parking brake switch, or parking brake mechanical problem

36. A Class 8 tractor's driver reports that the engine exhibits hesitation during maximum acceleration, with momentary loss of power before recovery. The most likely cause is:

A. Normal turbocharger lag during aggressive acceleration throttle input

B. Driver technique requiring smoother throttle application during acceleration

C. Turbocharger problem: wastegate, actuator, or boost pressure control issue producing delayed response

D. Fuel system problem: filter restriction, fuel pump failure, or fuel pressure regulation issue

37. The correct method for testing a commercial vehicle's battery capacity is:

A. Load test at half the battery's cold cranking amp (CCA) rating for 15 seconds, with voltage remaining above 9.6 volts at 70°F

B. Voltage measurement at rest, with acceptable reading above 12.6 volts for full charge

C. Electrolyte specific gravity test using a hydrometer with appropriate correction for temperature

D. Visual inspection of battery condition including case integrity and terminal condition

38. A technician inspecting a tractor's clutch finds the clutch pedal free travel has decreased from 1.5 inches to 0.25 inches over the past service interval. The most likely cause is:

A. Driver adjustment of the clutch pedal to their preference

B. Normal settling of the clutch components at the service interval

C. Clutch master cylinder failure producing reduced free travel

D. Wear in the clutch disc or pressure plate requiring clutch adjustment or service

39. The correct interpretation of a commercial vehicle's exhaust smoke pattern that shows gray smoke during sustained cruise operation is:

A. Normal diesel exhaust during sustained operation with complete combustion

B. Oil burning from worn piston rings producing continuous gray smoke

C. Possible engine problem: fuel-air ratio issue, injector wear, or aftertreatment problem requiring investigation

D. Normal variation in exhaust color during extended operation at highway speeds

40. The primary purpose of a commercial vehicle's coolant surge tank is to:

A. Filter contamination from the coolant during normal operation

B. Allow coolant expansion during heating and provide a reservoir for deaeration

C. Reduce coolant pressure during normal operation below radiator cap pressure

D. Distribute coolant flow between the engine and heater core during operation

41. A Class 8 tractor's driver reports that the truck pulls to one side only during heavy rain conditions. The vehicle operates normally in dry conditions. The most likely cause is:

A. Normal handling characteristic of a heavy-duty tractor during rain conditions

B. Driver technique requiring improvement during adverse weather conditions

C. Tire problems: uneven tread wear, reduced tread depth, or different tread patterns producing hydroplaning at one side

D. Alignment issue that only manifests during wet-surface operation

42. The correct action when a commercial vehicle's fuel filter restriction indicator shows the replacement zone is:

A. Replace the fuel filter with an OEM specified unit before the vehicle returns to service

B. Continue service if engine performance is normal during current operation

C. Adjust the fuel filter bypass valve to compensate for the restriction

D. Add fuel additive to reduce the effective filter restriction during operation

43. A technician inspecting a tractor's suspension finds that one shock absorber has visible oil residue on the body and reservoir. The most likely cause is:

A. Normal shock absorber aging with surface residue accumulated during service

B. Internal shock absorber seal failure allowing hydraulic fluid to escape — replacement required

C. External contamination from road spray during operation in wet conditions

D. Lubricant migration from the suspension bushings producing surface residue on the shock

44. The correct procedure for checking a commercial vehicle's engine exhaust system is to:

A. Run the engine with the exhaust disconnected to verify function without the system

B. Inspect the complete exhaust path for damage, leaks, secure mounting, and proper operation

C. Remove exhaust components for bench testing at a service center

D. Replace all exhaust hangers and clamps at each annual inspection

45. A Class 8 tractor's driver reports that the vehicle wanders during highway operation, particularly when lightly loaded. The most likely cause is:

A. Normal handling characteristic when the vehicle is not at rated gross weight

B. Driver fatigue during extended highway operation producing apparent wandering

C. Steering linkage wear, alignment issue, or tire pressure variation producing wandering behavior

D. Crosswind conditions during normal operation producing apparent wandering

46. The primary inspection criteria for a commercial vehicle's wheel rims is:

A. Visual examination for cracks, bends, corrosion, and integrity of mounting holes and valve stems

B. Removing rims from the vehicle for dye-penetrant testing

C. Dimensional measurement of the rim with precision instruments

D. Weight measurement of each rim compared to specification

47. A technician performing PMI finds that the commercial vehicle's battery negative cable terminal has significant corrosion, producing poor contact. The correct action is:

A. Apply battery terminal protector spray over the corroded area

B. Tighten the terminal connection to force contact through the corrosion

C. Disconnect the cable, clean the terminal and cable end thoroughly, reinstall with fresh protective compound

D. Replace both battery cables as preventive maintenance at the service

48. The correct interpretation of a commercial vehicle's engine producing a metallic rattling sound that occurs only at specific engine speeds is:

A. Normal engine operation at the specific RPM range

B. Timing chain tensioner problem or loose timing components at the engine front

C. Exhaust system component resonance at the specific RPM range

D. Intake manifold or air intake system loose connection vibrating at specific speed

49. The correct response when a commercial vehicle's tractor protection valve fails to function during emergency trailer disconnect testing is to:

A. Repair or replace the tractor protection valve before the vehicle returns to service

B. Monitor the valve operation at the next service interval

C. Continue service with the non-functional valve documented in the inspection

D. Apply service brake pressure manually during trailer disconnect situations

50. A Class 8 tractor's driver reports that the engine management system illuminates the "derate" warning light intermittently during operation. The most likely cause is:

A. Normal engine protection during sustained operation at maximum output

B. Incorrect calibration of the derate warning system

C. Aftertreatment system problem, DEF system issue, or fault condition triggering protective derate

D. Driver technique producing conditions that initiate derate protection

PRACTICE EXAM 9: ANSWER KEY AND EXPLANATIONS

1. A — A cyclical cooling-then-warming pattern with the A/C system indicates evaporator icing that builds over time, reducing airflow until cooling capacity drops. The off period allows the ice to melt, restoring capacity temporarily. Common causes include airflow restriction (cabin air filter), high humidity producing fast ice formation, or low refrigerant charge producing excessive cold at the evaporator.

2. D — Air reservoir drainage is performed by operating the manual drain valve at the bottom of the reservoir until only clean air (no water or contamination) discharges. This is the approved method for removing accumulated moisture. Fill plug removal, pressurization through secondary valves, and complete line disconnection are not correct procedures.

3. B — A knocking sound at cold startup that diminishes as the engine warms is characteristic of piston slap from worn piston skirts. At cold engine temperatures, piston-to-cylinder wall clearances are larger (cold metal is smaller); as the engine warms, thermal expansion closes these clearances and the slap diminishes. This pattern is diagnostic for piston skirt wear rather than bearing problems.

4. C — Excessive pushrod stroke at the specified test pressure requires investigation of the underlying cause (worn linings, maladjusted components, foundation brake wear, failed slack adjuster) and appropriate repairs. Manual slack adjuster adjustment is not the correct response — the problem must be addressed at its root. Cleaning products and return spring replacement do not resolve excessive stroke.

5. A — A missing rear axle breather cap must be replaced with the correct specification component to restore proper axle ventilation. The breather balances internal and external pressure while preventing contamination ingress. Without the cap, moisture, dirt, and debris enter the axle housing and contaminate the lubricant, accelerating wear.

6. D — Oil pressure that drops substantially during cruise indicates an engine oil pressure problem requiring diagnostic investigation across the lubrication system. Possible causes include pump wear, oil level issues, blockages, or internal wear. Normal operation does not produce substantial pressure drops; the condition warrants investigation beyond simple assumptions about any single cause.

7. B — A vibration that changes character when light brake pressure is applied typically indicates wheel bearing wear at the rear axle producing speed-dependent vibration. The brake application

loads the bearing differently, altering the vibration pattern. Engine mount and driveline issues produce different symptom patterns, and normal vibration does not change with braking.

8. C — Brake lining thickness measurement uses a brake lining depth gauge or calibrated ruler measuring from the friction surface to the backing plate. This provides a quantitative measurement comparable to specification. Visual estimation is insufficient for specification compliance; feeler gauges measure different parameters; left-right comparison without absolute measurement is not adequate.

9. A — A steering wheel oscillation at specific highway speeds, worse at higher speeds, is characteristic of front tire or wheel imbalance producing speed-dependent forces. Imbalance forces increase with rotational speed squared, producing symptoms only at and above the threshold speed. Balancing the tires or replacing damaged wheels typically resolves the condition.

10. D — Leaf spring bundle inspection is performed visually, checking for broken leaves, cracks, shifted leaves, and missing or damaged shackles. The inspection identifies all the conditions that affect spring performance and load capacity. Removal, height measurement alone, and hydraulic testing are not standard PMI procedures.

11. D — The spring brake modulating valve provides graduated (modulated) release of spring brakes during emergency air loss conditions. This prevents a sudden full application that could cause wheel lockup and loss of control. The driver retains some control during emergency situations, with the application increasing progressively as air pressure decreases.

12. B — Brown coolant with floating particulate matter indicates coolant contamination from system corrosion or chemistry degradation. This requires flush and refill with the correct coolant specification to restore proper chemistry. Normal coolant is clear and brightly colored; brown color with particulates indicates the coolant's chemistry has degraded and allowed corrosion products to accumulate.

13. A — A groaning sound during full steering input typically indicates low power steering fluid level, aerated fluid, or pump wear producing the characteristic sound under high-demand conditions. The sound occurs at maximum load on the steering system and reflects problems with the pump's ability to deliver adequate pressure under those conditions.

14. D — The specification for a tractor-trailer combination leak test with service brakes applied is 4 psi per minute maximum pressure drop. A 5 psi per minute reading exceeds this specification and requires investigation and repair of excessive leakage before return to service. Different specifications apply for tractor-alone and brakes-released conditions.

15. C — CCV system inspection verifies proper flow through the system, absence of oil pushing at seals (indicating elevated crankcase pressure), and condition of the CCV filter element. Multiple factors must be checked to assess CCV health. Simple filter inspection or vacuum measurement

alone do not provide the complete picture; scheduled replacement ignores the diagnostic value of inspection.

16. A — Damaged mud flaps with multiple tears and gaps must be replaced before the vehicle returns to service. Mud flaps are required safety equipment that protects other vehicles from road debris, rain spray, and ice. Damaged mud flaps fail to provide this protection. Continued service, duct tape repair, and complete removal are not acceptable responses.

17. D — Black smoke on quick acceleration typically indicates rich combustion from air-side insufficient response to fuel demand. Common causes include air intake restriction, turbocharger lag (or failure), or injector problems producing excess fuel relative to available air. Investigation targets these systems to identify the specific cause before repairs.

18. B — The radiator cap pressure rating maintains system pressure that raises the coolant boiling point above normal operating temperature. A properly rated cap allows the system to operate at pressures typically 15-20 psi above atmospheric, raising the boiling point significantly. A cap with incorrect pressure rating allows boiling at normal operating temperatures, producing coolant loss and overheat risk.

19. C — Viscous fan clutch testing is performed through visual inspection of the clutch for fluid leakage, unusual sounds, and temperature response during warm-up. A healthy clutch engages progressively as engine temperature rises and disengages as temperature falls. Direct measurement and bench testing are not standard PMI procedures; scheduled replacement ignores condition assessment.

20. A — Visible water droplets at the exhaust outlet during cold-weather operation are normal condensation in the exhaust system. Water is a combustion byproduct, and in cold weather the exhaust system cools sufficiently to allow condensation of this water vapor. The condensation drips from the outlet as droplets. No service action is required.

21. B — A bent or damaged brake chamber return spring requires replacement of the brake chamber assembly — individual spring replacement is not an approved repair. The chamber is an integrated assembly, and field spring replacement introduces reliability concerns. Proper replacement of the complete chamber ensures reliable operation.

22. C — A worn steering column U-joint with audible clicking during steering input requires replacement before the vehicle returns to service. Steering system integrity is critical for vehicle control, and worn components must be replaced, not lubricated or adjusted. Continued service with documented wear is not appropriate for a steering safety component.

23. C — The master cylinder reservoir cap vent allows atmospheric pressure equalization as fluid level changes with pad wear and temperature variation. Without the vent, pressure changes in the reservoir would affect brake operation. Contamination protection is provided by a separate filter element on the vent; the vent's primary function is pressure equalization.

24. D — Hesitation and stalling during low-speed acceleration with normal cruise behavior typically indicates fuel delivery problems specific to low-speed operation: clogged filters, fuel pressure problems, or air in the fuel system. At cruise speeds, the fuel demand and delivery conditions are different, masking the low-speed problem.

25. A — Brake hose inspection is performed by inspecting for cracks, bulges, chafing, fluid leakage, and secure mounting at both ends. These visual indicators identify hose problems that affect brake system integrity. Disassembly, pressure testing, and scheduled replacement ignore the condition-based inspection that is the standard method.

26. B — A fuel gauge reading below full when tanks are filled indicates fuel tank sending unit failure or wiring problem producing incorrect signal to the gauge. The sending unit converts the fuel level to an electrical signal that drives the dash gauge; any fault in this chain produces inaccurate readings. Gauge assembly failure is possible but less common than sending unit problems.

27. D — A turbocharger whining sound that changes pitch with engine load indicates bearing wear or other wear producing load-dependent noise. The turbocharger's condition affects engine performance and should be evaluated for replacement or service. Normal operation produces consistent sound patterns; load-dependent noise changes indicate developing problems requiring attention.

28. C — Uneven brake wear between left and right at the same axle position typically indicates brake imbalance at the worn side: dragging brake, stuck slack adjuster, or contaminated lining that produces more brake application than the matching side. Normal variation does not produce significant asymmetry; driver patterns affect both sides similarly.

29. B — ABS system testing requires connection of a scan tool compatible with the vehicle's ABS system to check for stored fault codes and system health. Maximum brake pressure road tests are dangerous and don't provide structured diagnosis; visual inspection alone is insufficient; individual sensor voltage measurement doesn't assess complete system function.

30. D — Significant steering wheel free play (2 inches of movement before tires respond) indicates wear in steering system components: the steering gear box, drag link, pitman arm, tie rod ends, or other steering linkage. Investigation of each component identifies the specific wear source. Normal wear does not produce this level of free play.

31. A — An alternator whining sound requires testing for bearing condition, rotor balance, and belt tension before determining whether replacement or service is needed. Diagnostic testing identifies the specific cause and guides appropriate action. Belt replacement alone, bearing lubrication, or preventive replacement without diagnosis are not appropriate responses.

32. D — Oil contamination in coolant requires investigation of the source before continuing operation. Common sources include failed oil cooler gaskets, failed head gaskets, or other internal engine

leak paths. Simply draining and refilling the coolant without addressing the source produces recurring contamination. The investigation must identify and repair the source.

33. B — Fifth wheel pivot inspection focuses on checking for excessive movement, wear, and proper lubrication at the pivot bearing surfaces. Excessive movement indicates worn components; inadequate lubrication accelerates wear; both require corrective action. Routine grease application without inspection, scheduled replacement, and precision angular measurement are not standard PMI practices.

34. A — A seat belt retractor that does not automatically retract has failed and requires replacement before the vehicle returns to service. Functional seat belts are safety equipment, and a failed retractor compromises the belt's ability to provide proper restraint. Lubrication, continued service, and tension adjustment are not appropriate responses.

35. D — A parking brake warning light that remains illuminated after the parking brake is released indicates one of three conditions: the parking brake is not fully released (mechanical or pneumatic problem), a failed parking brake switch, or a parking brake mechanical problem. Investigation determines which specific cause requires repair. Normal operation and bulb test extensions do not produce persistent illumination.

36. C — Hesitation during maximum acceleration with momentary power loss typically indicates turbocharger problems: wastegate malfunction, actuator failure, or boost pressure control issues. The turbocharger cannot respond quickly enough to the sudden demand, producing the hesitation and power loss before recovery. Normal turbocharger lag is brief; persistent or severe hesitation indicates problems.

37. A — Battery capacity testing is performed through load testing at half the battery's cold cranking amp (CCA) rating for 15 seconds. At 70°F, the voltage must remain above 9.6 volts throughout the test for the battery to pass. This test reveals capacity issues that simple voltage measurement cannot detect; the other methods identify different battery parameters.

38. D — Clutch pedal free travel decreasing from 1.5 inches to 0.25 inches over a service interval indicates wear in the clutch disc or pressure plate. As the friction material wears, the pressure plate moves toward the flywheel, reducing the free travel available at the pedal. The condition requires clutch adjustment or service to restore proper free travel.

39. C — Gray smoke during sustained cruise operation indicates possible engine problems: fuel-air ratio issues, injector wear, or aftertreatment problems. Normal diesel exhaust during cruise operation should be clear or nearly so. The investigation focuses on combustion quality, fuel system condition, and aftertreatment function to identify the specific cause.

40. B — A coolant surge tank allows coolant expansion during heating and provides a reservoir for deaeration. As the engine warms, coolant expands and the excess flows to the surge tank; as the

engine cools, coolant contracts and returns to the system. The tank also allows trapped air to separate from the coolant during operation, maintaining system efficiency.

41. C — A vehicle pulling to one side only during heavy rain typically indicates tire problems: uneven tread wear, reduced tread depth, or different tread patterns producing asymmetric water evacuation. The water cannot escape the tread on the problem tire, reducing traction on that side during wet conditions. Normal handling, driver technique, and alignment do not produce rain-specific pulling.

42. A — A fuel filter restriction indicator in the replacement zone requires filter replacement with an OEM-specified unit before the vehicle returns to service. Restriction affects fuel delivery, engine performance, and fuel economy. Continued operation with restricted filters produces deteriorating performance; the replacement is the correct remedy, not bypass adjustment or fuel additives.

43. B — Visible oil residue on a shock absorber body and reservoir indicates internal seal failure allowing hydraulic fluid to escape. Shock absorbers depend on internal hydraulic fluid to provide damping; leakage reduces effectiveness and eventually produces complete failure. The shock requires replacement, typically in pairs across an axle to maintain balance.

44. B — Commercial vehicle exhaust system inspection is a visual examination of the complete exhaust path for damage, leaks, secure mounting, and proper operation. Running with exhaust disconnected, removing components for bench testing, and scheduled replacement of hangers and clamps are not standard PMI procedures. The visual inspection covers all the conditions affecting exhaust system performance.

45. C — Vehicle wandering during highway operation, particularly when lightly loaded, typically indicates steering linkage wear, alignment issues, or tire pressure variation. Light loads reduce the damping forces that would mask minor wear; at higher loads, the wear may not be apparent. The investigation focuses on steering components and alignment.

46. A — Wheel rim inspection is a visual examination for cracks, bends, corrosion, and integrity of mounting holes and valve stems. These visual indicators identify rim problems that affect tire retention and vehicle safety. Removal for dye-penetrant testing, dimensional measurement, and weight measurement are not standard PMI procedures for rim inspection.

47. C — Corroded battery terminal connection requires disconnecting the cable, thoroughly cleaning both the terminal and cable end, and reinstalling with fresh protective compound. This is the correct remedy that restores reliable electrical contact. Spray-only protection, forced tightening, and cable replacement without cleaning do not address the underlying corrosion problem.

48. B — A metallic rattling sound at specific engine speeds typically indicates timing chain tensioner problems or loose timing components at the engine front. These components are stressed at specific RPM ranges and produce characteristic rattling when wear or failure occurs. Other causes produce different sound patterns; exhaust resonance produces different characteristics; intake connection problems produce different symptoms.

49. A — A tractor protection valve that fails during emergency trailer disconnect testing must be repaired or replaced before the vehicle returns to service. This valve is critical safety equipment that preserves tractor braking during trailer emergencies. Continued service with a non-functional valve is prohibited; manual service brake application cannot substitute for automatic protection.

50. C — Intermittent "derate" warning illumination during operation typically indicates aftertreatment system problems, DEF system issues, or fault conditions triggering protective derate. The engine management system reduces power to prevent further damage during these conditions. Diagnostic investigation identifies the specific cause and guides repair.