PRACTICE EXAM 8: ASE T8 PMI SIMULATION

1. During a PMI, the technician finds that a Class 8 tractor's engine exhibits low oil pressure at idle (15 psi) but normal pressure at elevated RPM (45 psi). The most likely cause is:

A. Incorrect oil pressure sending unit producing low-reading error

B. Oil pump failure requiring immediate replacement

C. Worn main or connecting rod bearings allowing excessive oil flow at low pressure

D. Overfilled oil level producing pressure displacement through the crankcase

2. The primary purpose of a diesel engine's fuel injection control module (ECM) for a common rail system is to:

A. Regulate the fuel return path from the injectors to the fuel tank

B. Control injection timing, quantity, and pattern based on operating conditions

C. Prevent fuel contamination by monitoring filter pressure differential

D. Adjust fuel temperature for optimal combustion characteristics

3. A technician performing PMI on a tandem-axle tractor finds that inter-axle differential oil temperature is significantly higher than expected. The most likely cause is:

A. Incorrect oil temperature sensor producing false high readings

B. Ambient temperature elevation during summer operation

C. Worn driveline components producing friction in the differential

D. Incorrect lubricant or contaminated lubricant producing inadequate cooling

4. The correct interpretation of a commercial vehicle's brake pedal that travels to within 1 inch of the floor before brakes engage is:

A. Significant brake system problem requiring immediate investigation and repair

B. Normal pedal travel for a hydraulic brake system at operating conditions

C. Driver technique issue that can be addressed through operator training

D. Expected variation based on brake pad material type installed

5. A technician inspecting a Class 8 tractor's fifth wheel finds visible grease contamination with embedded metal particles. The most likely cause is:

A. Normal grease aging at the service interval producing particulate accumulation

B. Dust and dirt contamination from operating in dusty conditions

C. Wear at the fifth wheel top plate or other contact surfaces generating metal particles

D. Improper grease selection introducing contamination during service

6. The correct response when a commercial vehicle's low air pressure warning device fails to activate during testing is to:

A. Replace the warning buzzer assembly and retest the system

B. Repair or replace the failed warning device before the vehicle returns to service

C. Continue service with the failed device documented for next interval

D. Reduce air system pressure to force activation of the warning function

7. A commercial vehicle's coolant reservoir shows visible oil film floating on top of the coolant. The most likely cause is:

A. Failed oil cooler gasket or head gasket allowing engine oil into the coolant

B. Normal coolant discoloration from additives used in the formulation

C. Improper coolant service introducing contamination during filling

D. Extended coolant service interval producing oxidation products on the surface

8. The correct procedure for verifying a trailer's air brake chamber diaphragm integrity is to:

A. Remove the chamber and inspect the diaphragm visually

B. Pressurize the chamber to maximum system pressure and measure chamber dimensions

C. Apply brake pedal pressure while listening for audible leaks at the chamber body

D. Observe airflow from the chamber breather vent during operation to detect diaphragm damage

9. A Class 8 tractor with automated mechanical transmission (AMT) exhibits a shift delay of approximately 2-3 seconds during upshifts. The most likely cause is:

A. Normal AMT behavior during warm-up after initial startup

B. Driver pedal input timing interfering with AMT shift logic

C. Insufficient air pressure at the AMT shift actuator or internal valve problem

D. Low transmission fluid level reducing hydraulic pressure in the shift circuits

10. The correct interpretation of a commercial vehicle's parking brake that will not fully release despite proper system pressure is:

A. Normal parking brake behavior during extended cold-weather storage

B. Spring brake or control valve problem preventing full release of the parking brake

C. Operator error in releasing the parking brake dash control

D. Brake drum thermal expansion creating mechanical interference with release

11. The primary cause of a commercial vehicle's A/C system producing moisture or water dripping inside the cab is:

A. Restricted or disconnected evaporator drain tube allowing condensate to enter the cab

B. Normal condensation during high-humidity operation with the A/C active

C. Failed refrigerant seal producing leak into the cab ventilation system

D. Cabin air filter saturated with moisture and releasing water into the system

12. A driver reports that the steering feels loose or wandering during highway operation, particularly at lighter loads. The most likely cause is:

A. Driver technique requiring improvement during lightly loaded operation

B. Normal handling characteristic when a trailer is not attached to the tractor

C. Tire pressure too high at the steer axle for current load conditions

D. Steering gear, linkage, or kingpin wear producing excessive free play

13. Technician A says that a diesel engine's fuel system requires ultra-low sulfur diesel (ULSD) to protect the aftertreatment system components. Technician B says that ULSD fuel prevents injector damage from sulfur compounds in standard diesel fuel. Who is correct?

A. Technician A only

B. Both A and B

C. Technician B only

D. Neither A nor B

14. The correct procedure for verifying a commercial vehicle's stop lamp function is to:

A. Measure voltage at the stop lamp terminal with the brake pedal depressed

B. Compare stop lamp brightness between the left and right sides

C. Depress the brake pedal and verify that all installed stop lamps illuminate

D. Inspect the stop lamp switch for continuity without activating the brake pedal

15. A technician inspecting a tractor's drivetrain finds visible rust on the exposed portions of the driveshaft. The most likely action is:

A. Clean the driveshaft exterior and apply corrosion-resistant coating to prevent further damage

B. Replace the driveshaft assembly as a preventive measure against potential failure

C. Continue service since surface rust does not affect driveshaft integrity

D. Lubricate the driveshaft splines to prevent corrosion migration to internal components

16. The correct interpretation of a commercial vehicle's air dryer discharging substantial oil during the purge cycle is:

A. Normal air dryer operation expelling accumulated contamination from the system

B. Oil-contaminated cartridge requiring immediate replacement for system protection

C. Excessive ambient humidity producing heavy condensate discharge at purge

D. Compressor wear allowing oil to pass into the air system and accumulate at the dryer

17. A Class 8 tractor's driver reports the parking brake applies only partially when the control is activated, requiring additional pressure on the dash control to hold the vehicle. The most likely cause is:

A. Normal parking brake response at varying pressure conditions

B. Driver expectation inconsistent with actual parking brake performance specifications

C. Spring brake chamber damage, control valve problem, or low system air pressure

D. Parking brake drum contamination reducing friction coefficient at the brake surface

18. The correct method for testing a commercial vehicle's alternator output is to:

A. Measure battery voltage with the engine off to compare to engine-running voltage

B. Use a regulated load tester connected across the battery with the engine running

C. Observe the dash voltmeter reading during driver operation to verify charging

D. Disconnect the alternator from the battery and test open-circuit voltage

19. A technician performing PMI discovers a commercial vehicle with a brake drum showing visible cracks radiating from the drum bolt holes. The correct action is:

A. Apply sealant to the cracks and continue service with monitoring

B. Document the cracks and schedule drum replacement at the next service interval

C. Machine the drum surface to remove the crack propagation zones

D. Replace the brake drum before the vehicle returns to service

20. The correct interpretation of a commercial vehicle's steering wheel that produces a humming vibration at highway speeds but is smooth at lower speeds is:

A. Tire or wheel imbalance, or wheel bearing issue producing speed-dependent vibration

B. Power steering system fluid aeration at higher operating speeds

C. Normal steering wheel feedback from road surface characteristics at speed

D. Steering gear mounting looseness producing resonance at specific speeds

21. A technician inspecting a tractor finds that one of the front wheel lug nuts has visible thread damage to the stud. The correct action is to:

A. Apply thread repair compound to the damaged threads and retorque to specification

B. Replace the damaged wheel stud and adjacent lug nut before returning vehicle to service

C. Use a longer lug nut to engage undamaged thread section of the stud

D. Continue service if the nut can still be torqued to specification

22. The correct interpretation of a diesel engine that produces excessive black smoke when starting cold is:

A. Normal cold-start combustion for a diesel engine before warm-up

B. Low engine compression preventing proper combustion temperature

C. Excessive fuel delivery at startup from a failed fuel control

D. Possible fuel injector problem, intake restriction, or cold-weather combustion issue

23. A Class 8 tractor's air brake system builds pressure from 50 psi to 90 psi within 25 seconds during testing. The specification is 25 seconds for this range. The correct interpretation is:

A. Below-specification build-up time indicating compressor or system problem

B. Above-specification build-up time indicating compressor performance improvement

C. Within-specification build-up time, system is operating correctly

D. Invalid test conditions requiring retest with the engine at governed RPM

24. The correct procedure for checking the fluid level in a commercial vehicle's automatic transmission is to:

A. Operate the engine at idle with the transmission in neutral or park, at operating temperature

B. Shut off the engine and check level 5 minutes later with the vehicle on level ground

C. Operate at elevated RPM with the transmission in drive at operating temperature

D. Check the level with the engine cold and the transmission in park on level ground

25. A commercial vehicle with an engine compression brake (Jake brake) produces a loud hammering sound during operation. The most likely cause is:

A. Normal compression brake operation at full engagement under heavy grade conditions

B. Exhaust brake valve malfunction producing excessive backpressure during engagement

C. Worn engine components allowing excessive piston or valve movement during engagement

D. Incorrect valve adjustment or engine mechanical problem affecting the compression brake operation

26. The correct interpretation of a driver's report that the vehicle's headlamps dim significantly during engine starting is:

A. Normal headlamp behavior during high-amperage starter engagement

B. Weakened battery, corroded cables, or marginal charging system indication

C. Failed dimmer switch producing uncontrolled headlamp brightness reduction

D. Normal aging of headlamp bulbs requiring replacement at the next service

27. A technician inspecting a commercial vehicle finds a leaking air line at a fitting between the primary reservoir and the service brake valve. The correct action is to:

A. Apply pipe sealant to the fitting and retest the connection for leakage

B. Continue service if the leak rate is within the system's overall leak specification

C. Repair or replace the leaking fitting and retest the system to verify leak-free operation

D. Apply thread-locking compound to the fitting to prevent future leakage

28. The specified maximum air leakage rate for a combination vehicle with the service brakes applied is:

A. 4 psi per minute pressure drop

B. 1 psi per minute pressure drop

C. 6 psi per minute pressure drop

D. 10 psi per minute pressure drop

29. A Class 8 tractor's driver complains of reduced fuel economy over recent operating weeks with no change in driving patterns or routes. The technician should first investigate:

A. Engine management system software updates to improve fuel economy performance

B. Air filter condition, fuel filter condition, and aftertreatment system operation

C. Driver training deficiency contributing to reduced economy during operation

D. Tire tread depth and alignment as factors affecting fuel consumption

30. The correct interpretation of a commercial vehicle's dash-mounted check engine light illuminating during operation is:

A. Normal engine warning during initial power-up and operation

B. Failed dashboard warning lamp requiring bulb replacement

C. Diagnostic trouble code stored in the engine control module, requiring scan tool investigation

D. Stored diagnostic fault requiring scan tool connection to identify the specific problem

31. A technician performing PMI discovers a commercial vehicle's brake chamber with visible rust and corrosion on the housing. The correct action is:

A. Continue service if the rust is only surface-level and the housing integrity is intact

B. Remove the rust and apply corrosion-resistant coating to the chamber exterior

C. Evaluate the chamber for structural integrity and replace if corrosion has affected function

D. Replace the brake chamber as preventive maintenance regardless of current condition

32. The correct procedure for inspecting a commercial vehicle's fuel tank straps is to:

A. Visually verify strap integrity, check mounting security, and inspect for cracks or damage

B. Remove the fuel tank and inspect the straps for internal corrosion during PMI

C. Weigh the fuel tank to verify straps are supporting the correct load

D. Replace fuel tank straps at each annual inspection as preventive maintenance

33. A driver reports that the vehicle's defrost function does not clear the windshield effectively during cold-weather operation. The engine heats normally. The most likely cause is:

A. Normal defrost limitation in cold climates at startup conditions

B. Cabin air filter restriction reducing airflow to the defrost outlets

C. Driver technique error in selecting appropriate defrost settings

D. Failed mode door preventing proper airflow routing to the windshield defrost vents

34. The primary purpose of the service brake relay valve in a commercial vehicle air brake system is to:

A. Regulate air pressure between the primary and secondary reservoirs during operation

B. Provide rapid brake application by using a local air supply rather than distant tractor air

C. Control air pressure delivered to the trailer brake chambers during application

D. Filter contamination from the service brake signal line during operation

35. The correct interpretation of a commercial vehicle's engine that starts and runs for a few seconds, then stalls, is:

A. Normal engine operation during extreme cold-weather startup conditions

B. Low engine oil pressure at startup preventing continued operation

C. Fuel system problem: air in fuel lines, fuel filter restriction, fuel pump failure, or fuel contamination

D. Electrical system problem affecting ignition or fuel system operation

36. A technician inspecting a commercial vehicle's fifth wheel locking mechanism finds that the primary jaw does not fully engage the kingpin despite multiple coupling attempts. The correct action is:

A. Remove the vehicle from service and repair the fifth wheel mechanism before continuing

B. Use the secondary safety catch as primary retention during operation

C. Apply additional grease to the fifth wheel to facilitate better engagement

D. Attempt coupling with a different trailer to verify the fifth wheel function

37. The correct procedure for testing a commercial vehicle's turn signal operation is to:

A. Verify voltage at the turn signal bulb sockets with the switch activated

B. Measure current flow through the turn signal circuit at the control switch

C. Compare flash rate between left and right turn signals for consistency

D. Activate left and right turn signals and verify all lamps flash at the proper rate

38. A Class 8 tractor is experiencing reduced braking effectiveness during heavy application on a grade. All system pressures are at specification and no leaks are present. The most likely cause is:

A. Normal brake fade during sustained heavy application on extended grade

B. Driver technique requiring improvement during grade descent braking

C. Worn brake linings, glazed friction surfaces, or contaminated brake components producing reduced friction

D. Excessive trailer brake force applied beyond tractor brake system capacity

39. The correct interpretation of a commercial vehicle's engine that smokes heavily from the oil fill cap opening when it is removed during operation is:

A. Normal engine operation with slight crankcase pressure at the oil fill location

B. Excessive blowby from worn piston rings, failed CCV, or other internal engine problem

C. Oil aeration during normal operation producing visible vapor at the fill opening

D. Restricted oil drain back in the valve cover producing pressure at the fill location

40. The specified test pressure for conducting a pushrod stroke measurement on a commercial vehicle's air brake system is:

A. 90-100 psi at the brake chamber during application testing

B. 120-125 psi at the maximum system pressure during testing

C. 50-60 psi at the partial application pressure for safety

D. System pressure at any level, as long as the chamber is fully applied

41. A technician inspecting a tractor finds oil accumulation on the engine rear and extending to the bell housing between the engine and transmission. The most likely cause is:

A. Normal residual oil from recent service that has not completely drained

B. Transmission front seal failure allowing transmission fluid to accumulate

C. Rear main engine seal failure allowing engine oil to escape between the engine and transmission

D. Rear engine crankshaft seal leak or transmission front seal leak requiring diagnostic investigation

42. The correct procedure for checking a commercial vehicle's windshield wiper performance is to:

A. Activate wipers at all speeds and verify smooth operation without streaks or skipping

B. Operate the wipers during a water application to verify wet-condition performance

C. Measure wiper blade pressure against the windshield using a pressure gauge

D. Time wiper operation at maximum speed setting to verify specification compliance

43. A Class 8 tractor's driver reports that the vehicle pulls to the right during heavy braking, but tracks straight during normal operation. The most likely cause is:

A. Brake imbalance at the left front wheel producing reduced braking force on that side

B. Right rear trailer brake dragging during braking producing side-biased deceleration

C. Alignment issue at the front steer axle producing pull only during braking

D. Driver technique error applying excessive brake pedal pressure on grade descents

44. The correct interpretation of a commercial vehicle's coolant temperature gauge reading that moves above the normal operating range during sustained highway operation is:

A. Normal coolant temperature variation during extended operation in warm weather

B. Driver error in monitoring coolant temperature conditions during operation

C. Overheating condition requiring diagnostic investigation of cooling system components

D. Cooling system operating at peak efficiency during highway cruise conditions

45. A technician performing PMI discovers that a commercial vehicle has a loose mounting bolt on the steering gear box, allowing slight movement during steering input. The correct action is:

A. Apply thread-locking compound to the bolt and retorque to specification

B. Inspect the mounting and attaching surfaces, replace damaged hardware, and retorque to specification

C. Continue service if the vehicle tracks straight during normal operation

D. Weld the bolt to the frame to prevent further loosening during operation

46. The correct method for verifying that a commercial vehicle's electric horn is functioning is to:

A. Measure voltage at the horn terminal to verify electrical supply to the horn

B. Test the horn circuit continuity with the horn disconnected from the harness

C. Listen for a hum from the horn assembly during key-on prove-out cycle

D. Activate the horn from the steering wheel control and verify audible sound output

47. A driver reports that the vehicle's engine experiences occasional surges during cruise operation at highway speeds. The most likely cause is:

A. Fuel system issue: fuel filter restriction, fuel pump problem, or fuel quality issue

B. Normal diesel engine response to varying road grade during cruise control operation

C. Driver foot pressure on the accelerator producing inadvertent speed variation

D. Transmission torque converter lockup cycling during operation

48. The correct procedure for inspecting a commercial vehicle's engine cooling fan for condition is to:

A. Rotate the fan by hand with the engine off and observe operation

B. Activate the fan electrically and measure current draw at the fan motor

C. Visually inspect fan blades for damage, cracks, and secure mounting at the hub

D. Replace the fan assembly at each annual inspection as preventive maintenance

49. The correct interpretation of a commercial vehicle's battery voltage reading 12.4 volts with the engine off and no loads is:

A. Fully charged battery at optimal operating condition

B. Partially discharged battery requiring charging before service

C. Severely discharged battery requiring immediate replacement

D. Overcharged battery indicating potential charging system problem

50. A Class 8 tractor's dash-mounted tachometer shows engine RPM fluctuating wildly during operation, with readings alternating between 500 and 2500 RPM. The most likely cause is:

A. Engine operating condition producing wide RPM variation during normal operation

B. Failed engine speed sensor or wiring problem affecting tachometer signal

C. Tachometer gauge failure or electrical connection problem producing erratic readings

D. Engine control module programming issue requiring software update at the service center

PRACTICE EXAM 8: ANSWER KEY AND EXPLANATIONS

1. C — Low oil pressure at idle that recovers at elevated RPM is characteristic of worn main or connecting rod bearings. The increased bearing clearances allow oil to flow out of the pressurized galleries faster than the pump can replace it at low speeds; at higher RPM, the pump output overcomes the leakage and pressure recovers. This pattern indicates progressive internal wear requiring diagnostic investigation.

2. B — The fuel injection control module (ECM) controls injection timing, quantity, and pattern based on real-time operating conditions — engine speed, load, temperature, and throttle position. Common rail systems rely on precise electronic control to achieve the multiple injection events per cycle that modern diesels require. Simple fuel flow regulation, contamination monitoring, and temperature adjustment are not the primary ECM function.

3. D — Elevated inter-axle differential oil temperature most commonly traces to incorrect lubricant specification or contaminated lubricant, both of which reduce the oil's ability to carry heat away from gear contact points. Using the wrong viscosity or a contaminated fluid dramatically reduces cooling effectiveness, producing the elevated temperatures observed during operation.

4. A — A brake pedal that travels within 1 inch of the floor before brakes engage indicates a significant brake system problem requiring immediate investigation. Possible causes include severe pad/lining wear, air in hydraulic systems, low fluid level, or master cylinder failure. This is not a normal condition and cannot be addressed through driver training or pad material variation.

5. C — Visible grease contamination with embedded metal particles on a fifth wheel indicates wear at the fifth wheel top plate or other contact surfaces. The metal particles come from the wearing surfaces themselves — the fifth wheel top plate, the locking mechanism, or the trailer upper coupler. This finding warrants inspection for wear limits and component service as needed.

6. B — A non-functional low air pressure warning device must be repaired or replaced before the vehicle returns to service. The warning device is a critical safety feature alerting the driver when air pressure falls to dangerous levels. Continued operation without this warning is prohibited because the driver would have no indication of developing brake system problems.

7. A — Visible oil film on the coolant surface indicates engine oil has entered the cooling system, which most commonly traces to a failed oil cooler gasket or head gasket. Both failures allow oil to migrate into the coolant under pressure. The condition requires diagnostic investigation to identify the specific leak source, and service is required beyond routine PMI.

8. D — Brake chamber diaphragm integrity is verified by observing airflow from the chamber breather vent during operation. The breather is designed to allow small air exchanges during normal operation; significant airflow during application or release indicates a failed diaphragm allowing air to escape through the non-pressurized side. This is a non-invasive and reliable inspection method.

9. C — AMT shift delay of 2-3 seconds during upshifts typically indicates insufficient air pressure at the AMT shift actuator or internal valve problems. The AMT requires adequate air pressure to operate its pneumatic actuators rapidly; any pressure shortage or internal valve obstruction produces the described delay. Normal behavior, driver input, and fluid issues produce different patterns.

10. B — A parking brake that will not fully release despite proper system pressure indicates a spring brake or control valve problem preventing full release. Possible causes include stuck spring brake mechanism, failed control valve, or damaged release mechanism. This prevents the spring brakes from fully retracting and requires diagnostic investigation and repair.

11. A — Moisture or water dripping inside the cab from an A/C system most commonly traces to a restricted or disconnected evaporator drain tube. The drain tube normally routes condensate from the evaporator to outside the vehicle; restriction or disconnection allows the condensate to accumulate and enter the cab instead. The repair involves clearing or reconnecting the drain path.

12. D — Loose or wandering steering, particularly at lighter loads, indicates steering gear, linkage, or kingpin wear producing excessive free play. Without adequate load to dampen the play, the vehicle wanders as the free play allows uncontrolled directional changes. The condition requires inspection of the steering system components to identify and correct the source of excessive play.

13. A — Technician A is correct. Ultra-low sulfur diesel (ULSD) protects the aftertreatment system components (DOC, DPF, SCR catalysts) from sulfur poisoning that higher-sulfur fuels would produce. Technician B is incorrect — the primary reason for ULSD is aftertreatment protection, not injector damage prevention. Modern injectors are generally compatible with both fuel types.

14. C — Stop lamp function verification consists of depressing the brake pedal and verifying that all installed stop lamps (main stop lamps and center high-mount stop lamp) illuminate. This is a direct functional test that confirms complete circuit operation. Voltage measurement, brightness comparison, and switch-only testing are not adequate verification methods.

15. C — Surface rust on exposed driveshaft portions does not affect driveshaft structural integrity or function. The surface rust is cosmetic and does not indicate structural compromise. The driveshaft splines and working surfaces are lubricated and protected from exterior corrosion. No service action is required for surface rust alone.

16. D — Air dryer discharging substantial oil during the purge cycle indicates compressor wear allowing oil to pass into the air system and accumulate at the dryer. The cartridge then collects this

oil and releases it during purge cycles. The underlying cause is compressor wear requiring diagnostic investigation and likely compressor service, not simply replacing the cartridge.

17. C — Partial parking brake application requiring additional pressure to hold the vehicle indicates spring brake chamber damage, control valve problem, or low system air pressure. The parking brake should apply fully when the control is activated; partial application indicates a problem with the spring brake mechanism or the release/application logic. Diagnostic investigation identifies the specific cause.

18. B — Alternator output testing requires a regulated load tester connected across the battery with the engine running. The load tester applies a controlled electrical load while measuring voltage, confirming the alternator's ability to maintain voltage under load. Simple voltmeter readings, dash gauge observation, and open-circuit testing do not adequately verify alternator capacity.

19. D — A brake drum showing visible cracks radiating from bolt holes is a structural defect requiring replacement before the vehicle returns to service. Crack propagation in cast iron drums is progressive and can lead to catastrophic drum failure. Sealants, monitoring, and machining are not acceptable responses to structural drum cracks.

20. A — A steering wheel vibration at highway speeds that is smooth at lower speeds typically indicates tire or wheel imbalance or a wheel bearing issue producing speed-dependent vibration. Imbalance forces increase with speed squared, producing symptoms only at higher speeds. Power steering, road surface feedback, and mounting issues produce different symptom patterns.

21. B — Thread damage to a wheel stud requires replacing the damaged stud and the adjacent lug nut before the vehicle returns to service. Thread repair compounds and longer lug nuts do not restore the structural integrity of the stud's threaded engagement. The fastener must be capable of reliable torque to specification, which damaged threads cannot provide.

22. D — Excessive black smoke at cold starting on a diesel indicates possible fuel injector problems, intake restriction, or cold-weather combustion issues. Low compression and excessive fuel delivery produce different symptoms. Some black smoke at cold start is tolerable, but excessive smoke warrants diagnostic investigation to identify the specific cause.

23. C — The build-up time of 25 seconds from 50 psi to 90 psi matches the 25-second specification, indicating the system is operating correctly. Air pressure build-up specifications are tight tolerances that confirm compressor and air system health. Meeting the specification within the expected time range confirms the system is within normal operating parameters.

24. A — Automatic transmission fluid level is checked with the engine at idle, the transmission in neutral or park (per manufacturer specification), at operating temperature, on level ground. This reflects actual working fluid distribution under normal operating conditions. Engine-off, cold, and drive-at-elevated-RPM checks do not produce accurate readings.

25. D — Loud hammering from an engine compression brake during operation indicates incorrect valve adjustment or mechanical problems affecting the compression brake operation. Normal compression brake operation produces a characteristic sound but not hammering. Possible causes include incorrect valve lash, worn components, or internal engine problems affecting compression brake function.

26. B — Headlamps dimming significantly during engine starting indicates weakened battery, corroded cables, or marginal charging system. The starter draws substantial current during cranking, and if the battery and cables cannot maintain voltage under that load, dimming occurs. Normal starting should not produce significant headlamp dimming. Testing the battery and cable voltage drop identifies the specific cause.

27. C — A leaking air line fitting requires repair or replacement of the leaking fitting, followed by retest to verify leak-free operation. Sealants, thread-locking compounds, and continued operation with the leak do not address the root cause of the fitting failure. Proper repair or replacement with specified components restores reliable operation.

28. A — The specified maximum air leakage rate for a combination vehicle with service brakes applied is 4 psi per minute pressure drop. Combination vehicles allow more leakage than tractor-alone vehicles due to additional connections, lines, and components. Brakes-released specifications are lower than brakes-applied specifications.

29. B — Reduced fuel economy without changes to driving patterns or routes should first be investigated through air filter condition, fuel filter condition, and aftertreatment system operation. Restrictions in any of these systems reduce combustion efficiency and fuel economy. ECM updates, driver training, and tire/alignment factors are secondary considerations after verifying basic system condition.

30. C — An illuminated check engine light during operation indicates a diagnostic trouble code stored in the engine control module, requiring scan tool investigation to identify the specific fault. The warning lamp is part of the vehicle's diagnostic system, not a normal operational indicator. The code must be retrieved before repairs can be made; clearing the code without addressing the root cause produces recurring failures.

31. C — A brake chamber with visible rust and corrosion requires evaluation for structural integrity. Surface rust may not affect function, but corrosion that has affected the housing structure compromises the chamber's ability to contain pressure reliably. Evaluation determines whether the chamber can continue service or requires replacement; simple continued service without evaluation is not appropriate.

32. A — Fuel tank strap inspection is a visual procedure verifying strap integrity (no cracks, corrosion, or damage), checking mounting security, and inspecting the attachment points. Straps secure the fuel tank against vibration and road impact; failed straps can allow tank movement leading to hose

damage or fuel leaks. Removal for internal inspection and weighing are not standard PMI procedures.

33. D — Defrost function failure with normal engine heating typically indicates a failed mode door preventing proper airflow routing to the windshield defrost vents. The mode door selects between different HVAC output paths (floor, defrost, vent); a failed mode door cannot direct heated air to the defrost outlets. Filter restrictions and driver technique produce different patterns.

34. B — The service brake relay valve provides rapid brake application by using a local air supply rather than distant tractor air. The relay valve is typically mounted near the wheels it serves, allowing rapid air delivery to the brake chambers without the time delay of air traveling through long service brake lines. This improves brake response time significantly.

35. C — An engine that starts and runs briefly before stalling typically has a fuel system problem: air in fuel lines, fuel filter restriction, fuel pump failure, or fuel contamination. The engine starts on residual fuel in the system, then stalls when fresh fuel cannot be delivered. The diagnostic investigation focuses on the fuel delivery path.

36. A — A fifth wheel mechanism that cannot achieve full kingpin engagement requires removal from service until the mechanism is repaired or replaced. The secondary safety catch is not a substitute for proper primary engagement. Grease and trailer substitution do not address the mechanism failure; the fifth wheel must function reliably for safe coupling.

37. D — Turn signal operation is verified by activating left and right turn signals and confirming all lamps flash at the proper rate. The proper flash rate is typically 60-120 flashes per minute; a rate outside this range indicates burned-out bulbs, wiring problems, or other faults. Voltage measurement alone and current flow testing do not verify complete operation.

38. C — Reduced braking effectiveness with all system pressures at specification and no leaks present typically traces to worn brake linings, glazed friction surfaces, or contaminated brake components. Thermal effects from sustained heavy braking can temporarily reduce effectiveness, but mechanical issues produce consistent reduced performance. Diagnostic investigation identifies the specific cause.

39. B — Heavy smoke from the oil fill cap opening during engine operation indicates excessive blowby, most commonly from worn piston rings, failed crankcase ventilation (CCV) system, or other internal engine problems. Normal operation produces minimal vapor at the fill location. Significant smoke indicates internal mechanical issues requiring diagnostic investigation.

40. A — Pushrod stroke measurement is performed at 90-100 psi applied pressure at the brake chamber. This range represents typical operating brake application pressure and produces consistent, comparable measurements across different brake chambers. Lower pressures produce partial application and invalid readings; higher pressures are above normal operating specification.

41. D — Oil accumulation on the engine rear extending to the bell housing indicates a rear engine crankshaft seal leak or transmission front seal leak. Both seals are at this interface location, and the source requires diagnostic investigation to differentiate between engine oil and transmission fluid. Residual oil from service alone does not produce this accumulation pattern.

42. B — Wiper performance verification is best performed during a water application to verify wet-condition operation, which is when wipers matter most. Activating wipers on dry glass can produce wear patterns that don't represent actual operation. The water test shows whether the wipers actually clear the windshield effectively under operational conditions.

43. A — A vehicle pulling to the right during heavy braking but tracking straight normally indicates brake imbalance at the left front wheel producing reduced braking force on that side. During normal operation, the imbalance is not apparent; during braking, the imbalance creates the pull. The investigation focuses on the left front brake system components.

44. C — A coolant temperature gauge reading above normal operating range during sustained highway operation indicates an overheating condition requiring diagnostic investigation. Possible causes include failed thermostat, low coolant, restricted radiator, failed fan, or water pump problems. Normal operation does not produce elevated temperatures; the condition requires investigation beyond PMI scope.

45. B — A loose steering gear box mounting bolt requires inspection of the mounting and attaching surfaces, replacement of damaged hardware, and retorque to specification. The mounting must be structurally sound to provide reliable steering control. Thread-locking compound alone does not address damaged hardware; welding is not an approved frame modification method.

46. D — Electric horn function is verified by activating the horn control from the steering wheel and confirming audible sound output. This is a direct functional test that confirms the complete circuit and horn operation. Voltage measurement, continuity testing, and hum observation do not verify the horn actually produces sound when commanded.

47. A — Engine surges during cruise operation typically indicate fuel system issues: fuel filter restriction, fuel pump problems, or fuel quality concerns. Fuel delivery interruptions produce inconsistent power output that shows as surges. Normal cruise control response to road grade, driver input errors, and torque converter cycling produce different symptom patterns.

48. C — Engine cooling fan inspection is a visual procedure checking fan blades for damage, cracks, and secure mounting at the hub. Damaged fan blades can produce imbalance, noise, and potential separation during operation. Rotation by hand and electrical testing are secondary procedures; the visual inspection is the primary method.

49. B — A battery voltage of 12.4 volts at rest indicates a partially discharged battery at approximately 75 percent of full charge. A fully charged battery reads 12.6-12.8 volts. The 12.4 V reading is

below full charge and indicates the battery should be charged before extensive service. This is not severely discharged but is below optimal condition.

50. C — Wildly fluctuating tachometer readings during operation typically indicate tachometer gauge failure or electrical connection problems producing erratic readings. Actual engine RPM does not vary this dramatically during normal operation. The investigation focuses on the tachometer circuit: connections, signal source, and gauge function. Engine speed sensor issues would affect multiple systems, not just the tachometer.