

PRACTICE EXAM 11: ASE T8 PMI

SIMULATION

1. A technician performing a PMI notes fuel accumulation in the pan of the fuel filter housing drain tray on the ground underneath the vehicle. The fuel lines appear intact. The most likely cause is:

- A. Normal fuel filter operation during extended service intervals
- B. Fuel filter seal failure or internal filter damage producing external leakage
- C. Fuel tank overflow during filling at the previous fuel stop
- D. Fuel system pressure regulator fault producing excessive system pressure

2. The correct interpretation of a commercial vehicle's engine showing oil accumulation on the valve covers with no visible gasket leak is:

- A. Normal operation producing atmospheric oil mist around the valve covers
- B. External oil migration from nearby engine components during operation
- C. Oil splash during oil service that has not been completely cleaned
- D. Potential valve cover gasket failure developing with intermittent leakage patterns

3. A Class 8 tractor's driver reports that the cab feels excessively warm during summer operation despite the A/C running at maximum. The technician confirms A/C system function is normal. The most likely cause is:

- A. Cab insulation degradation or seal problems allowing external heat infiltration
- B. Driver's perception error regarding A/C system effectiveness in hot conditions
- C. Normal cab temperature variation during extreme ambient conditions

D. A/C system operating at design maximum with no available improvement

4. The correct procedure for verifying a commercial vehicle's engine cooling fan clutch engagement is to:

A. Remove the fan clutch and bench test with a service-grade tester

B. Replace the fan clutch at scheduled intervals as preventive maintenance

C. Operate the engine through warm-up and observe fan speed increase as coolant temperature rises

D. Apply air pressure to the fan clutch to verify engagement mechanism

5. A technician inspecting a tractor's driveshaft finds that a U-joint has visible play when the shaft is rocked. The correct action is:

A. Apply grease to the U-joint through the lubrication fitting to reduce play

B. Replace the worn U-joint before the vehicle returns to service

C. Continue service if the shaft operates without audible noise during test

D. Balance the driveshaft to compensate for the play before return to service

6. The correct interpretation of a commercial vehicle's engine oil that shows a milky appearance is:

A. Normal oil appearance after extended operation at elevated temperatures

B. Oil aging producing chemistry changes at the manufacturer-specified service interval

C. Excessive fuel additive contamination affecting oil color and performance

D. Coolant contamination in the oil from internal engine leak requiring investigation

7. A technician performing PMI finds a commercial vehicle's air filter restriction indicator showing the yellow (warning) zone. The correct action is:

A. Replace the air filter element before the vehicle returns to service

- B. Continue service since the indicator has not yet reached the red zone
- C. Adjust the restriction indicator to reset the warning display
- D. Bypass the air filter temporarily to restore normal engine performance

8. The correct interpretation of a commercial vehicle's brake chamber that shows visible corrosion on the mounting hardware is:

- A. Normal exterior aging with surface oxidation during service
- B. Driver operating pattern creating exposure to corrosive conditions
- C. Potential structural compromise of mounting requiring evaluation and possible replacement
- D. Paint degradation producing visible exposure of the metal hardware

9. A Class 8 tractor's driver reports the engine exhibits hesitation during highway cruise, with intermittent loss of acceleration response. The most likely initial investigation should focus on:

- A. Normal cruise control operation during varying grade conditions
- B. Driver technique during highway operation requiring adjustment
- C. Transmission torque converter lockup cycling producing apparent hesitation
- D. Fuel system issues: filter restriction, fuel quality problem, or pump issues

10. The correct procedure for checking a commercial vehicle's transmission fluid condition is to:

- A. Measure fluid temperature and compare to operating specification
- B. Pull the transmission dipstick and examine color, odor, and texture of the fluid
- C. Drain a sample from the torque converter during operation
- D. Replace transmission fluid preventively at scheduled intervals

11. A technician inspecting a tractor's air dryer finds visible oil on the cartridge housing surface. The most likely cause is:

- A. Normal air dryer operation producing oil drainage during purging
- B. External oil contamination from nearby engine components
- C. Air compressor fluid leak transferred through the system to the dryer
- D. Compressor internal wear allowing oil to pass into the air system and reach the dryer

12. The correct interpretation of a commercial vehicle's exhaust smoke that is black during full acceleration only is:

- A. Insufficient air supply during acceleration: air restriction, turbocharger problem, or intake leak
- B. Normal diesel engine exhaust during full acceleration conditions
- C. Fuel pump producing excessive fuel delivery during acceleration events
- D. Injector failure producing rich mixture only during acceleration demand

13. A Class 8 tractor has a driver complaint of the vehicle drifting toward the right during highway operation with no crosswind. The most likely cause is:

- A. Worn rear brake shoes producing side-biased stopping during coast conditions
- B. Normal vehicle behavior requiring driver steering correction during operation
- C. Alignment problem: camber, caster, or toe settings out of specification
- D. Tire pressure difference between steer and drive axles affecting tracking

14. The correct method for verifying a commercial vehicle's seat belt function is to:

- A. Replace seat belts at scheduled intervals as preventive maintenance
- B. Extend the seat belt fully and release it to verify proper retraction and engagement

- C. Measure seat belt webbing strength with a pressure gauge
- D. Apply weight to the seat belt to test the locking mechanism

15. A commercial vehicle's driver reports that the wheel bearings produce a humming noise during highway operation that increases with vehicle speed. The most likely cause is:

- A. Wheel bearing wear requiring inspection and possible replacement
- B. Normal wheel bearing operation during highway cruise conditions
- C. Tire tread pattern producing road noise at highway speeds
- D. Driveshaft imbalance producing humming sound transferred through the suspension

16. The correct procedure for inspecting a commercial vehicle's spring brake chamber for condition is to:

- A. Remove the spring brake chamber for bench inspection of internal components
- B. Apply maximum air pressure and measure chamber dimensions
- C. Pressurize the chamber to verify spring force measurement
- D. Visual inspection for housing damage, mounting integrity, and pushrod stroke

17. A technician performing PMI finds that a commercial vehicle's battery has cracked terminal posts. The correct action is:

- A. Apply terminal paste to seal the cracks and continue service
- B. Tighten terminal connections to force contact past the cracks
- C. Replace the battery before the vehicle returns to service
- D. Continue service if the cracks do not affect electrical output

18. The correct interpretation of a commercial vehicle's steering system that produces noise only during specific steering maneuvers is:

- A. Normal steering system noise during varying load conditions
- B. Component wear or damage specific to the steering maneuver, requiring diagnostic investigation
- C. Driver steering technique during the specific maneuver producing apparent noise
- D. Road surface characteristics encountered during the maneuver transferring through the steering

19. A Class 8 tractor's driver reports reduced braking effectiveness during heavy application, with no system pressure issues detected. The most likely cause is:

- A. Normal brake fade during extended heavy application
- B. Driver technique requiring improvement during heavy braking events
- C. Electronic stability control system activation affecting brake application
- D. Brake lining wear, glazing, or contamination reducing friction coefficient

20. The correct procedure for checking a commercial vehicle's brake pedal free play is to:

- A. Measure the distance the pedal travels before encountering brake system resistance
- B. Apply maximum brake pedal pressure and measure the pedal position
- C. Compare brake pedal position to another vehicle of the same specification
- D. Measure brake pedal return speed after release

21. A technician inspecting a tractor finds oil contamination on the air compressor discharge hose. The most likely cause is:

- A. Air compressor internal wear allowing oil bypass past compression rings
- B. Engine oil leaking from external components onto the discharge hose

- C. Atmospheric contamination producing surface oil on the hose
- D. Incorrect hose routing placing it near oily engine components

22. The correct interpretation of a commercial vehicle's fuel gauge that reads full continuously without dropping during operation is:

- A. Normal fuel gauge operation during short-duration driving events
- B. Low fuel consumption producing minimal gauge change during operation
- C. Fuel tank sending unit failure or wiring problem preventing gauge response
- D. Driver operation producing minimal fuel consumption during routine operation

23. A driver reports that the vehicle's headlamps produce dimming during engine acceleration, with normal brightness at idle. The most likely cause is:

- A. Normal headlamp behavior during engine RPM changes
- B. Alternator output deficiency or charging system problem affecting electrical supply
- C. Driver technique producing apparent dimming during operation
- D. Battery capacity insufficient to maintain headlamp brightness during acceleration

24. The correct interpretation of a commercial vehicle's coolant temperature gauge that reads above normal during operation is:

- A. Normal coolant temperature variation during extended operation
- B. Driver error in monitoring coolant temperature during operation
- C. Coolant temperature sensor calibration error producing incorrect readings
- D. Cooling system problem: low coolant, failed thermostat, fan issue, or restriction

25. A Class 8 tractor's driver reports shifting is difficult, with the transmission refusing to engage certain gears despite normal clutch operation. The most likely cause is:

- A. Normal shifting behavior requiring driver technique adaptation
- B. Transmission internal problem: worn synchronizers, failed shift forks, or internal damage
- C. Low transmission fluid level producing insufficient hydraulic pressure
- D. Excessive gear oil viscosity affecting shift mechanism during operation

26. The correct procedure for inspecting a commercial vehicle's air brake service reservoir is to:

- A. Visual inspection for corrosion, mounting integrity, and proper drain valve operation
- B. Removal of the reservoir for pressure testing at a service center
- C. Replacement of the reservoir at scheduled intervals as preventive maintenance
- D. Measurement of internal reservoir volume compared to specification

27. A technician performing PMI finds that a trailer's turn signal lamp shows much dimmer brightness than the matching lamp on the opposite side. The most likely cause is:

- A. Normal variation in lamp brightness between vehicle sides
- B. Driver technique producing preferential wear on one lamp
- C. Matching bulb installed with identical specifications on both sides
- D. Burned bulb, corroded connection, or high resistance in the dim lamp circuit

28. The correct interpretation of a commercial vehicle's engine that produces blue smoke during startup but clears within a few minutes is:

- A. Normal diesel engine startup behavior during cold-weather conditions
- B. Severe engine damage requiring immediate shutdown and service

- C. Worn valve guide seals allowing oil into the cylinders during engine off periods
- D. Fuel injector problem producing smoke only during initial combustion

29. A driver reports that the vehicle's speedometer reads incorrectly compared to GPS speed — the speedometer shows 5-10 mph higher than actual speed. The most likely cause is:

- A. Driver perception error regarding vehicle speed during operation
- B. Vehicle speed sensor calibration error or tire size variation from specification
- C. Normal speedometer variation expected at different operating speeds
- D. GPS system error producing inaccurate speed readings

30. The correct procedure for testing a commercial vehicle's alternator output voltage is to:

- A. Measure voltage at the battery posts with the engine off
- B. Visual inspection of the alternator during engine operation
- C. Replace the alternator at scheduled intervals as preventive maintenance
- D. Measure voltage at the battery posts with the engine running at various RPMs

31. A Class 8 tractor's rear brakes show uneven wear across the same axle. The driver has reported no recent handling problems or crash events. The most likely cause is:

- A. Normal brake lining wear variation during routine operation
- B. Brake imbalance: stuck slack adjuster, dragging brake, or contaminated lining at one wheel
- C. Driver braking technique producing preferential wear on one side
- D. Tire pressure difference affecting brake application force

32. The correct interpretation of a commercial vehicle's A/C system that produces cold air initially but loses cooling over a 15-minute operation period is:

- A. Normal A/C behavior during summer operation at extended durations
- B. Driver setting error reducing A/C effectiveness after initial operation
- C. Compressor clutch cycling producing apparent temperature variation
- D. Evaporator icing, refrigerant charge issue, or compressor problem producing cyclical capacity loss

33. A technician inspecting a tractor's engine cooling system finds the radiator cap pressure rating marked 15 psi, but the cap will not hold pressure above 10 psi during testing. The correct action is:

- A. Replace the radiator cap with a new cap of the specified rating
- B. Continue service if the system maintains minimum operating pressure
- C. Adjust the cap internal spring to restore proper pressure rating
- D. Apply sealant around the cap seal to improve pressure retention

34. The correct interpretation of a commercial vehicle's brake drum with visible heat checking (fine surface cracks) is to:

- A. Apply drum-surfacing compound to smooth the cracks before service
- B. Continue service since heat checking is cosmetic and does not affect drum function
- C. Evaluate for severity — light heat checking may be acceptable, severe checking requires replacement
- D. Machine the drum to remove the surface cracks before return to service

35. A driver reports that the vehicle's trailer brakes engage with significant delay compared to the tractor brakes. Tractor brake response is normal. The most likely cause is:

- A. Normal trailer brake delay during combination vehicle operation

- B. Driver technique error producing apparent delay in trailer brake response
- C. Trailer service brake valve malfunction producing delayed response to signal
- D. Restricted service brake signal line, or failed trailer relay valve producing delayed application

36. The correct procedure for verifying a commercial vehicle's parking brake holding capability is to:

- A. Visual inspection of the parking brake mechanism for wear indicators
- B. Apply the parking brake on a moderate grade and verify the vehicle holds without rolling
- C. Measure parking brake application force with a pressure gauge
- D. Replace parking brake components at scheduled intervals as preventive service

37. A Class 8 tractor's engine oil analysis reveals elevated metal content with a specific pattern indicating bearing wear. The correct initial action is:

- A. Monitor the condition with more frequent oil analysis and prepare for potential engine service
- B. Replace the engine oil filter preventively to remove accumulated contamination
- C. Add engine oil supplements to extend bearing life
- D. Continue service since oil analysis results vary between samples

38. The correct interpretation of a commercial vehicle's driveshaft that produces a vibration only at specific operating speeds is:

- A. Normal driveshaft operation during varying speed conditions
- B. Driver perception error during operation at those speeds
- C. Driveshaft imbalance, damaged U-joint, or runout producing speed-specific vibration
- D. Engine performance issue affecting driveshaft operation at the specific RPM

39. A technician performing PMI finds that a tractor's fifth wheel grease shows metallic particles mixed in with the lubricant. The correct action is:

- A. Clean the grease and apply fresh grease to continue service
- B. Monitor the grease condition at the next service interval
- C. Apply additional grease to dilute the particle concentration
- D. Investigate wear source, assess severity, and address any identified component wear

40. The correct procedure for checking a commercial vehicle's front suspension for wear is to:

- A. Measure suspension height at each corner with the vehicle on level ground
- B. Visual inspection, wheel rocking to check for play, and measurement of components where specified
- C. Replace suspension components at scheduled intervals as preventive maintenance
- D. Apply hydraulic pressure to suspension components to verify integrity

41. A Class 8 tractor's engine produces a persistent rattling sound only at idle that disappears at elevated RPM. The most likely cause is:

- A. Normal diesel engine idle characteristics at varying ambient conditions
- B. Turbocharger bearing problem producing noise at low RPM conditions
- C. Fuel injector problem producing uneven combustion at idle speed
- D. Loose engine component producing idle-specific rattling at low RPM

42. The correct interpretation of a commercial vehicle's engine that experiences reduced power during extended sustained operation in hot weather is:

- A. Heat-induced component problem: cooling system issue, aftertreatment backpressure, or intake temperature problem

- B. Normal engine behavior during sustained operation in extreme heat conditions
- C. Driver technique requiring adaptation during hot-weather operation
- D. Engine control module programming requiring update for hot-weather conditions

43. A driver reports that the trailer has developed a vibration during highway operation that was not present at the previous inspection. The most likely cause is:

- A. New condition developed between inspections: tire imbalance, wheel damage, bearing wear, or driveline problem
- B. Normal trailer vibration expected at highway speeds
- C. Driver perception error comparing current operation to previous
- D. Load distribution on the trailer affecting vibration at operating speeds

44. The correct procedure for inspecting a commercial vehicle's power steering system is to:

- A. Pressure test the system at maximum operating pressure during PMI
- B. Disassemble the steering gear box for internal component inspection
- C. Visual inspection of fluid level, condition, hose integrity, and pump mounting
- D. Replace steering system components at scheduled intervals as preventive maintenance

45. A technician inspecting a tractor's brake chambers finds visible rust accumulating on the spring brake chamber clamp band. The correct action is:

- A. Apply spray lubricant to the clamp band to prevent additional corrosion
- B. Evaluate the clamp band for structural integrity and replace if corrosion has compromised function
- C. Continue service since surface rust on the clamp is cosmetic
- D. Replace the complete brake chamber as preventive maintenance

46. The specified maximum leakage rate for a tractor-trailer combination vehicle with service brakes released is:

- A. 4 psi per minute pressure drop
- B. 2 psi per minute pressure drop
- C. 3 psi per minute pressure drop
- D. 1 psi per minute pressure drop

47. A Class 8 tractor's driver reports that the vehicle requires extended cranking time to start in warm weather. The battery and starter motor are in normal condition. The most likely cause is:

- A. Fuel system issue: air in lines, fuel pump problem, or fuel delivery restriction
- B. Driver technique error during warm-weather starting sequence
- C. Normal warm-weather starting requiring extended cranking
- D. Engine control module programming requiring adjustment for warm conditions

48. The correct interpretation of a commercial vehicle's fifth wheel locking mechanism that shows light-duty operation during coupling is:

- A. Normal locking mechanism operation during coupling events
- B. Driver technique error during coupling maneuver producing apparent light operation
- C. Locking mechanism requires service: worn components, contamination, or inadequate adjustment
- D. Kingpin variation producing different feel during coupling events

49. A technician inspecting a tractor's coolant system finds that the radiator fins are bent and restricted across approximately 30% of the radiator surface area. The correct action is:

- A. Continue service if the cooling system maintains normal operating temperatures
- B. Straighten fins where possible, clean the radiator, and evaluate for replacement if damage is severe
- C. Apply coolant system sealant to compensate for reduced heat rejection capacity
- D. Adjust the cooling fan to run more frequently to compensate for the restriction

50. The correct procedure for verifying a commercial vehicle's turn signal flasher operation is to:

- A. Disconnect the flasher and test with external test equipment
- B. Measure voltage at the flasher terminal with the turn signal activated
- C. Activate each turn signal and verify that the signal lamps flash at the proper rate
- D. Replace the flasher at each annual inspection as preventive service

PRACTICE EXAM 11: ANSWER KEY AND EXPLANATIONS

1. B — Fuel accumulation on the ground beneath an intact fuel line indicates fuel filter seal failure or internal filter damage producing external leakage. The filter housing seals are a common leak source and deteriorate with service. Normal operation does not produce external leakage; the condition requires filter service to identify the specific failure and restore proper sealing.
2. D — Oil accumulation on valve covers with no visible gasket leak indicates potential valve cover gasket failure developing with intermittent leakage patterns. Early-stage gasket failure can produce oil migration under pressure cycles without a steady drip, leaving oil residue on the cover. The condition warrants monitoring or gasket replacement before progression to complete failure.
3. A — Excessive cab heat during summer operation with confirmed normal A/C function typically traces to cab insulation degradation or seal problems allowing external heat infiltration. Door seals, window seals, and firewall insulation age and permit heat transfer into the cab. The A/C system is working correctly but cannot overcome the heat load entering through compromised barriers.
4. C — Fan clutch engagement verification is performed by operating the engine through warm-up and observing fan speed increase as coolant temperature rises. A functional clutch engages progressively as temperature rises, drawing more airflow through the radiator. Visual and audible observation during normal operation provides reliable verification without disassembly or bench testing.
5. B — A U-joint with visible play when the shaft is rocked requires replacement before the vehicle returns to service. Worn U-joints progress to failure, and a failed U-joint during operation can cause driveshaft separation with potentially catastrophic consequences. Grease application and balance adjustment do not resolve the mechanical wear.
6. D — Milky engine oil indicates coolant contamination from an internal engine leak requiring investigation. The milky appearance is an oil-water emulsion formed when coolant enters the oil passages. Common causes include head gasket failure, cracked cylinder head, or oil cooler gasket leakage. The condition requires diagnostic investigation beyond routine PMI scope.
7. A — An air filter restriction indicator in the yellow (warning) zone indicates the filter has reached its replacement threshold and must be replaced before the vehicle returns to service. Yellow-zone operation produces reduced engine performance and accelerated wear on downstream components. The yellow zone is the replacement signal; waiting for the red zone delays proper service.

8. C — Visible corrosion on brake chamber mounting hardware indicates potential structural compromise requiring evaluation. Corrosion can affect the hardware's ability to maintain proper torque and secure mounting. The hardware may require replacement, cleaning and anti-corrosion treatment, or other corrective action based on the extent of corrosion found during evaluation.
9. D — Engine hesitation during highway cruise with intermittent acceleration loss typically indicates fuel system issues: filter restriction, fuel quality problems, or fuel pump issues. These conditions produce inconsistent fuel delivery that shows as hesitation. The investigation focuses on the fuel delivery path to identify the specific cause.
10. B — Transmission fluid condition is evaluated by pulling the dipstick and examining the fluid's color (should be red or amber, not brown), odor (should not smell burnt), and texture (should not contain particles). These indicators reveal transmission health. Temperature measurement, sampling during operation, and scheduled replacement do not provide the same condition assessment.
11. D — Oil on an air dryer cartridge housing typically indicates compressor internal wear allowing oil to pass into the air system and reach the dryer. The oil accumulates on and in the dryer cartridge, contaminating the desiccant and requiring cartridge replacement along with compressor investigation. External contamination and purge-related oil discharge produce different patterns.
12. A — Black smoke only during full acceleration indicates insufficient air supply during the high-demand condition. Air restriction (filter, intake leak, CAC leak), turbocharger problems, or intake leaks all reduce the air available to match fuel demand at peak output. Normal operation does not produce smoke at full acceleration; fuel system issues produce different patterns.
13. C — Right drift during straight-line highway operation without crosswind typically indicates an alignment problem with camber, caster, or toe settings out of specification. Alignment issues cause the vehicle to track off-center; investigation focuses on measuring and correcting the specific alignment parameters. Brake, operational, and tire pressure issues produce different patterns.
14. B — Seat belt function is verified by extending the belt fully and releasing it to verify proper retraction and engagement. This is a direct functional test confirming the belt's ability to restrain during normal and emergency conditions. Preventive replacement, pressure testing, and weight application are not standard verification methods.
15. A — Humming noise that increases with vehicle speed typically indicates wheel bearing wear. The bearings produce the characteristic humming sound as internal components wear and clearances increase. The noise scales with rotational speed because the wear produces greater clearance and more noise at higher rotation rates. Investigation identifies the specific bearing requiring service.
16. D — Spring brake chamber inspection is a visual procedure examining for housing damage, mounting integrity, and pushrod stroke measurement. The spring brake chamber contains substantial spring energy and cannot be safely disassembled; visual inspection and stroke

measurement provide the needed assessment. Removal for bench testing and pressure-based measurements are not standard PMI procedures.

17. C — A battery with cracked terminal posts requires replacement before the vehicle returns to service. Terminal post damage compromises the ability to maintain reliable electrical connection, and the cracks typically propagate producing progressive failure. Paste application and forced connection do not restore mechanical integrity to cracked terminals.
18. B — Steering system noise only during specific maneuvers typically indicates component wear or damage specific to that maneuver. Different steering inputs produce different load patterns and directions, and specific wear affects specific maneuvers. Investigation identifies the component responsible: ball joints, tie rod ends, drag link, steering gear, or other components.
19. D — Reduced braking effectiveness with no pressure issues typically traces to brake lining wear, glazing, or contamination reducing the friction coefficient. The foundation brakes cannot produce adequate braking force even when pressure is correct. Normal brake fade occurs but has specific conditions; driver technique doesn't affect the braking mechanism itself.
20. A — Brake pedal free play is measured by determining the distance the pedal travels before encountering brake system resistance. This is the range of pedal motion that produces no braking action — the play in the pedal linkage before engagement. Maximum pressure measurement, vehicle comparison, and return speed are not the correct measurement technique for free play.
21. A — Oil contamination on the air compressor discharge hose typically indicates compressor internal wear allowing oil bypass past compression rings and seals. The oil exits with the compressed air and accumulates on the discharge line. External oil and atmospheric contamination produce different patterns; incorrect hose routing does not produce the specific oil contamination.
22. C — A fuel gauge that reads full continuously without dropping during operation indicates a fuel tank sending unit failure or wiring problem preventing the gauge from responding to fuel level changes. The sending unit's mechanism is stuck in the "full" reading position, or the wiring between sending unit and gauge has failed, preventing signal transmission.
23. B — Headlamp dimming during engine acceleration, with normal idle brightness, indicates alternator output deficiency or charging system problem. The alternator struggles to maintain voltage during acceleration when engine-driven load increases, and the voltage drop affects the headlamps. Normal operation, driver technique, and pure battery capacity produce different patterns.
24. D — An elevated coolant temperature gauge during operation indicates a cooling system problem: low coolant level, failed thermostat, fan issue, or restriction in the cooling path. These conditions reduce the system's heat rejection capacity. Normal variation does not produce consistently elevated readings; sensor calibration errors and driver monitoring produce different patterns.

25. B — Difficult shifting with transmission refusing to engage certain gears despite normal clutch operation indicates a transmission internal problem: worn synchronizers, failed shift forks, or internal damage. The external components are functioning correctly, but the internal shifting mechanism cannot complete gear engagement. Internal service is required.
26. A — Air brake service reservoir inspection is a visual procedure examining for corrosion, mounting integrity, and proper drain valve operation. These visual indicators identify reservoir problems. Removal for pressure testing and scheduled replacement are not standard PMI procedures; internal volume measurement is not relevant to routine inspection.
27. D — A trailer turn signal lamp significantly dimmer than the matching side typically indicates a burned bulb, corroded connection, or high resistance in the circuit supplying that lamp. These reduce the current reaching the bulb, producing the dimmer output. Normal variation and driver technique do not produce this level of brightness difference.
28. C — Blue smoke at startup that clears within minutes is typically caused by worn valve guide seals allowing oil into the cylinders during engine off periods. The accumulated oil burns off during warmup, producing the blue smoke that clears quickly. Persistent blue smoke indicates more serious problems; normal cold weather and injector issues produce different patterns.
29. B — Speedometer reading 5-10 mph higher than actual speed indicates a vehicle speed sensor calibration error or tire size variation from specification. The speed is calculated based on wheel rotation and tire size; mismatches produce systematic reading errors. Tire size changes from worn vs new, different manufacturer, or tire size substitution can produce these variations.
30. D — Alternator output voltage is measured at the battery posts with the engine running at various RPMs. A healthy charging system maintains 13.8-14.4 volts across the operating RPM range. Engine-off measurement shows battery voltage; visual inspection doesn't verify output; scheduled replacement ignores the actual condition assessment.
31. B — Uneven rear brake wear across the same axle with no crash events typically indicates brake imbalance: stuck slack adjuster, dragging brake, or contaminated lining at one wheel. One wheel is producing more braking effort than the matching wheel, causing preferential wear. Investigation identifies the specific cause to guide repair.
32. D — An A/C system that produces cold air initially but loses cooling over time typically indicates evaporator icing, refrigerant charge issues, or compressor problems producing cyclical capacity loss. The icing restricts airflow; charge issues produce inadequate cooling; compressor problems produce variable output. Investigation identifies which specific cause applies.
33. A — A radiator cap that cannot hold its rated pressure requires replacement with a new cap of the specified rating. The cap is a wear component that deteriorates with service, and replacement restores proper pressure-holding capability. Sealant application, spring adjustment, and continued service with reduced pressure do not address the component failure.

34. C — Brake drum heat checking requires evaluation for severity: light heat checking may be acceptable for continued service, but severe heat checking indicates the drum has reached end of life and requires replacement. Heat checking develops from repeated thermal cycles and progresses over time. Surfacing compounds and unlimited continued service are not appropriate without severity evaluation.
35. D — Delayed trailer brake application with normal tractor response typically indicates a restricted service brake signal line or failed trailer relay valve. The signal does not reach the trailer brake chambers at the expected rate, producing the delay. Relay valve problems specifically affect the rate of signal response to produce the delayed application pattern.
36. B — Parking brake holding capability is verified by applying the parking brake on a moderate grade and confirming that the vehicle holds without rolling. This functional test confirms the brake can handle real-world holding conditions. Visual inspection, pressure measurement, and scheduled replacement do not verify actual holding capability.
37. A — Elevated metal content in engine oil analysis with a bearing wear pattern requires monitoring with more frequent oil analysis and preparation for potential engine service. The specific metal pattern identifies the wear source; monitoring tracks progression rate; potential engine service allows planning for needed repairs. Filter replacement alone and supplements do not address the underlying wear.
38. C — Driveshaft vibration only at specific operating speeds typically indicates driveshaft imbalance, damaged U-joint, or runout producing speed-specific vibration. Rotational imbalance produces forces that scale with speed; damaged U-joints and runout produce characteristic speed-dependent patterns. Investigation identifies the specific cause.
39. D — Metallic particles in fifth wheel grease requires investigation of the wear source, assessment of severity, and corrective action for any identified component wear. The particles indicate wear at some contact surface; the investigation identifies which component, evaluates whether it requires replacement, and guides appropriate service. Cleaning, monitoring, and grease dilution do not address the underlying wear.
40. B — Front suspension wear is inspected through visual observation, wheel rocking to check for play, and measurement of components where specifications apply. These procedures identify the conditions that affect suspension performance. Height-only measurement, scheduled replacement, and hydraulic testing do not provide the required assessment of suspension condition.
41. D — A persistent rattling sound only at idle that disappears at elevated RPM typically indicates a loose engine component producing idle-specific rattling at low RPM. At elevated RPM, increased vibration and harmonic effects may mask or change the rattle. Common causes include loose heat shields, loose brackets, or loose accessory mounting hardware.

42. A — Reduced engine power during extended sustained operation in hot weather typically traces to heat-induced component problems: cooling system issues, aftertreatment backpressure, or intake temperature problems. Elevated temperatures affect engine performance through multiple paths. Normal behavior does not include significant power reduction; ECM programming and driver technique produce different patterns.
43. A — New trailer vibration at highway operation that was not present at the previous inspection indicates a new condition has developed: tire imbalance, wheel damage, bearing wear, or driveline problem. The change-over-time pattern points to a condition that has developed during the service interval. Investigation identifies the specific new condition requiring service.
44. C — Power steering system inspection is a visual procedure examining fluid level, condition, hose integrity, and pump mounting. These inspections identify the conditions that affect steering system performance. Pressure testing, disassembly, and scheduled replacement are not standard PMI procedures for routine inspection.
45. B — A brake chamber clamp band with accumulating rust requires evaluation for structural integrity and replacement if corrosion has compromised function. The clamp band holds substantial spring energy and must maintain structural integrity to prevent catastrophic failure. Surface rust may be acceptable; progressive corrosion requires assessment and potentially replacement.
46. C — The specified maximum leakage rate for a tractor-trailer combination vehicle with service brakes released is 3 psi per minute pressure drop. Different specifications apply for brakes applied (4 psi/min) and tractor-alone configurations (2 psi/min released). The 3 psi/min standard reflects the combination vehicle's additional connections and components.
47. A — Extended cranking time to start in warm weather with normal battery and starter typically indicates a fuel system issue: air in lines, fuel pump problems, or fuel delivery restriction. The engine cannot start rapidly because fuel delivery is inadequate. Normal warm-weather starting does not require extended cranking; driver technique and ECM programming produce different patterns.
48. C — A fifth wheel locking mechanism showing light-duty operation during coupling typically indicates the mechanism requires service: worn components, contamination, or inadequate adjustment. The mechanism should engage firmly and reliably during coupling. Driver technique and kingpin variation produce different symptoms; normal operation produces firm, consistent engagement.
49. B — Radiator fins bent and restricted across 30% of surface area requires straightening fins where possible, cleaning the radiator, and evaluating for replacement if damage is severe. This restores as much cooling capacity as can be recovered while assessing whether the damage exceeds acceptable limits. Continued service, sealants, and fan adjustment do not address the restricted heat rejection.

50. C — Turn signal flasher operation is verified by activating each turn signal and confirming that the signal lamps flash at the proper rate. A normal flash rate is 60-120 flashes per minute; rates outside this range indicate component problems. Bench testing, voltage measurement, and scheduled replacement do not verify actual operation at the correct flash rate.