PRACTICE EXAM 10: ASE A8 ENGINE PERFORMANCE FULL-LENGTH SIMULATION

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50 Questions | 75 Minutes

DOMAIN A — GENERAL DIAGNOSIS (Questions 1–12)

1. A vacuum gauge at idle shows a steady 18 in/Hg that drops to zero under hard acceleration and recovers immediately when the throttle is released. What does this MOST likely indicate?

A. Normal vacuum behavior — manifold vacuum drops to near zero at wide-open throttle

B. A large vacuum leak that becomes significant only under acceleration

C. Exhaust restriction collapsing manifold vacuum under high exhaust flow

D. Retarded ignition timing causing vacuum loss under load

2. A compression test shows all cylinders between 160 and 175 psi except cylinders 2 and 3, which read 95 psi each. A wet test on both shows no improvement. What is the MOST likely cause?

A. Worn rings on both cylinders 2 and 3

B. A cracked piston on cylinder 2 affecting adjacent cylinder pressure

C. A blown head gasket between cylinders 2 and 3

D. Carbon deposits preventing valve seating on both cylinders simultaneously

3. An engine has a knock that is present only during the first 30 seconds of a cold start and disappears completely as oil pressure builds. What is the MOST likely cause?

A. Worn connecting rod bearings that lose their oil film during extended shutdown

B. A hydraulic timing chain tensioner bleeding down during shutdown and slapping on cold start

C. Piston slap from cold bore clearance that resolves with thermal expansion

D. A collapsed hydraulic lifter that recovers once oil reaches the valvetrain

4. A cylinder leakage test shows 12% leakage with no air heard escaping from any location. What is the correct interpretation?

A. The rings are worn and air is escaping slowly past them into the crankcase

B. The intake valve is slightly open and air is leaking slowly into the intake manifold

C. A head gasket breach is present but the leak path is too small to hear

D. This is within the acceptable leakage range and no mechanical fault is indicated

5. An engine has gray smoke at idle that increases under load and smells of burning oil. Compression is normal on all cylinders. What is the MOST likely cause?

A. A rich air-fuel mixture producing incomplete combustion and gray exhaust

B. A stuck-open EGR valve diluting the mixture and producing gray exhaust

C. Worn valve stem seals or oil control rings allowing oil consumption without affecting compression

D. A PCV system fault routing excessive oil vapor into the intake manifold under all conditions

6. A technician performs a cooling system pressure test. The system holds pressure at 16 psi for 20 minutes with no drop. What does this confirm?

A. No internal or external cooling system leaks are present at the test pressure

B. The head gasket is intact — a combustion leak test is still required to confirm

C. The radiator cap pressure rating is correct and holding system pressure

D. The water pump seal is intact and not contributing to pressure loss

7. A relative compression test shows all cylinders cranking at similar speed and amperage except cylinder 4, which cranks noticeably faster. What does this indicate?

A. Cylinder 4 has increased compression from carbon buildup increasing resistance

B. A fuel injector fault on cylinder 4 is affecting the cranking resistance reading

C. The CKP sensor produces a stronger signal near the cylinder 4 position affecting speed measurement

D. Cylinder 4 has reduced compression and is offering less resistance to the starter

8. An engine has a persistent oil consumption complaint. Blue smoke is visible under all driving conditions. Compression is 175 psi on all cylinders and leakage is under 8% on all cylinders. What is the MOST likely cause?

A. Worn piston rings allowing oil consumption under all operating conditions

B. Worn valve stem seals allowing oil to be drawn into all cylinders consistently

C. A PCV system fault routing excessive oil vapor into the intake manifold

D. An overfilled crankcase forcing oil past normal sealing surfaces under all conditions

9. A snap-throttle vacuum test shows the needle drops sharply on acceleration then returns to 3 in/Hg above the original idle baseline before settling back. What does this indicate?

A. Normal snap-throttle response with no fault present

B. A sticking valve causing delayed vacuum recovery

C. Exhaust restriction causing backpressure to push the vacuum reading above baseline on recovery

D. Retarded ignition timing causing a delayed return to normal idle vacuum

10. A technician finds coolant in the engine oil. The oil appears milky and tan. What should the technician check FIRST?

A. The oil cooler for a failed internal core allowing coolant to enter the oil circuit

B. The intake manifold gasket for a leak allowing coolant to drain into the oil passages

C. The cylinder head for a crack allowing coolant to migrate into the oil passages

D. The head gasket for a failure allowing coolant to enter the oil passages

11. An engine has rough idle and a vacuum reading of 10 in/Hg that increases to 18 in/Hg when idle RPM is raised to 2,000. What does this MOST likely indicate?

A. A severely restricted exhaust system that reduces vacuum only at idle

B. Retarded ignition timing causing low vacuum at idle that improves with RPM

C. A large vacuum leak that has greater effect at idle than at higher RPM

D. Worn piston rings that seal better at higher RPM from centrifugal force

12. A no-start condition exists. Spark is confirmed at all plugs. Fuel pressure is 58 psi. Injector pulse is confirmed on all cylinders. Compression is 170 psi on all cylinders. A timing light during cranking shows no spark advance at all — spark fires at TDC regardless of cranking speed. What is the MOST likely cause?

A. A shorted ignition coil preventing the PCM from advancing timing

B. A failed CKP sensor causing the PCM to default to a fixed TDC timing strategy

C. A jumped timing chain causing all spark events to fire at TDC position

D. A failed PCM unable to calculate timing advance during cranking

DOMAIN B — IGNITION SYSTEM DIAGNOSIS AND REPAIR (Questions 13–20)

13. A spark plug shows a cracked porcelain insulator with no electrode wear or deposits. What is the MOST likely cause?

A. Pre-ignition causing thermal stress fractures in the insulator over time

B. Normal long-service wear causing the insulator to crack at the service interval

C. Rich combustion causing carbon buildup that eventually fractures the insulator

D. Physical damage from improper installation torque or dropping the plug

14. A COP system has a confirmed misfire on cylinder 3. The technician swaps the cylinder 3 coil to cylinder 6. After a test drive, P0306 sets and P0303 does not return. What does this confirm?

A. The coil originally on cylinder 3 has failed and is the cause of the misfire

B. The spark plug on cylinder 3 is fouled and requires replacement

C. The PCM driver circuit for cylinder 3 has a fault that follows the coil

D. The fuel injector on cylinder 3 is restricted causing a lean misfire

15. A primary ignition waveform shows a normal current ramp during dwell but the coil fires before the current reaches its normal peak saturation level. What does this indicate?

A. A weak coil requiring less current to reach saturation than a new unit

B. Dwell time is too short — the coil is firing before reaching full magnetic saturation

C. A shorted primary winding allowing current to reach saturation faster than normal

D. PCM timing advance reducing dwell at higher RPM to maintain timing accuracy

16. An oscilloscope secondary waveform shows a normal firing line but no spark line — the waveform drops immediately to the oscillation section after the firing line. What does this MOST likely indicate?

A. A wide spark plug gap preventing the arc from sustaining after initiation

B. A high-resistance plug wire causing voltage to collapse immediately after firing

C. A shorted or fouled spark plug that cannot sustain an arc across the gap

D. A weak coil that fires but cannot maintain the arc for the normal burn period

17. A Hall effect CKP sensor is tested. The signal wire shows 0 volts continuously during cranking. The reference voltage wire shows 5 volts at the sensor connector. What is the MOST likely cause?

A. A PCM input circuit fault holding the signal line at zero volts

B. An open ground circuit causing the sensor output to default to zero volts

C. A short to ground on the signal wire holding the circuit at zero volts regardless of sensor output

D. A failed sensor — with reference voltage confirmed, an all-zero signal output indicates internal sensor failure

17. A Hall effect CKP sensor has a signal wire showing 0 volts continuously during cranking. Reference voltage is confirmed at 5 volts at the sensor connector. What is the MOST likely cause?

A. A PCM input circuit fault holding the signal at zero

B. An open ground circuit causing default zero output

C. A short to ground on the signal wire

D. A failed sensor with reference voltage confirmed

18. A distributor ignition system has a consistent misfire on one cylinder. The plug wire for that cylinder is swapped with a known-good wire from another cylinder. The misfire moves to the new cylinder. What does this confirm?

A. The distributor cap terminal for the affected cylinder has carbon tracking

B. The plug wire originally on the misfiring cylinder has high resistance and is the cause

C. The spark plug on the original cylinder is fouled and requires replacement

D. The ignition coil is producing insufficient secondary voltage for that circuit path

19. A magnetic reluctance CKP sensor waveform shows consistent amplitude and pattern at all RPM except the waveform goes completely flat for 0.5 seconds intermittently. What does this MOST likely indicate?

A. An intermittent open or short in the CKP sensor circuit causing total signal loss during the dropout

B. A PCM input circuit fault that periodically rejects the CKP signal during sampling

C. A designed reference gap that is wider than normal causing an extended flat section

D. Normal sensor behavior during rapid RPM transitions between idle and cruise speeds

20. A waste spark system fires cylinders in pairs. Which statement correctly describes the compression and exhaust stroke relationship of paired cylinders?

A. Both cylinders in the pair fire on their compression strokes simultaneously

B. One cylinder in the pair fires on its exhaust stroke while the other fires on its compression stroke

C. Both cylinders fire on their exhaust strokes while the compression fire occurs on the next cycle

D. The cylinders alternate — one fires compression while the paired cylinder fires intake stroke

DOMAIN C — FUEL, AIR INDUCTION, AND EXHAUST SYSTEMS (Questions 21–30)

21. A fuel pressure test on a return-style system shows 62 psi at key-on. Pressure drops to 48 psi at idle. Specification is 58 psi at idle with vacuum applied to the regulator. What is the MOST likely cause?

A. A fuel pressure regulator stuck open allowing excessive fuel return at idle vacuum levels

B. A partially clogged fuel filter reducing available pressure under flow demand at idle

C. A weak fuel pump unable to maintain specification pressure under idle flow demand

D. Normal pressure drop — return-style systems always show lower pressure at idle than at key-on

22. A MAF-equipped engine has a P0101 MAF range performance code. The MAF reads 8.4 g/s at idle on a system specified at 3.5–5.0 g/s. No vacuum leaks are found. LTFT is -22% on both banks. What is the MOST likely cause?

A. A MAF sensor reading high causing the PCM to over-deliver fuel

B. A stuck-open EVAP purge solenoid adding vapor and triggering a MAF performance code

C. A contaminated MAF sensor reading low and triggering the performance code

D. A cracked intake duct downstream of the MAF introducing unmetered air

23. An engine has a hot-start problem. It starts normally when cold but requires 8–10 seconds of cranking when hot. Fuel pressure holds at 54 psi for 30 minutes after hot shutdown. What should the technician check NEXT?

A. The fuel pump check valve for a fault allowing drain-back after hot shutdown

B. The fuel pressure regulator for a fault bleeding pressure after hot shutdown

C. The injectors for leaking allowing vapor lock to develop in the rail after hot shutdown

D. The fuel pump for reduced output when fuel temperature is elevated

23. An engine starts normally cold but requires 8–10 seconds of cranking when hot. Fuel pressure holds at 54 psi for 30 minutes after shutdown. What should the technician check NEXT?

A. The fuel pump check valve for drain-back

B. The fuel pressure regulator for pressure bleed-down

C. The injectors for leaking — fuel pressure holds but vapor lock may develop in the hot rail

D. The fuel pump for reduced hot output

24. A TPS voltage at idle is 0.45 volts and increases smoothly to 4.55 volts at WOT. A P0123 TPS high input code is stored. What is the MOST likely cause?

A. The TPS signal wire has a short to the 5-volt reference holding the voltage above specification

B. The TPS is functioning correctly — 0.45 to 4.55 volts is a normal sweep range

C. The TPS idle voltage of 0.45 volts is below the minimum specification triggering the code

D. The PCM reference voltage is too high at 5 volts causing a high input reading

25. A GDI engine has a confirmed P0087 high-pressure rail low code. The low-pressure pump delivers 65 psi to the high-pressure pump inlet. The high-pressure rail reads 450 psi against a 1,500 psi specification at idle. What is the MOST likely cause?

A. A leaking high-pressure injector bleeding rail pressure between injection events

B. A high-pressure rail pressure sensor fault producing a false low reading

C. A low-pressure pump delivering insufficient volume to the high-pressure pump inlet

D. A worn or failing high-pressure mechanical fuel pump unable to generate adequate rail pressure

26. A naturally aspirated engine has a vacuum of 17 in/Hg at idle and 19 in/Hg at 2,500 RPM. A propane enrichment test near the intake manifold base improves idle quality noticeably. What is the MOST likely cause of the idle vacuum being slightly low?

A. Retarded ignition timing causing low vacuum at idle only

B. A small vacuum leak at the intake manifold base reducing idle vacuum

C. A weak valve spring causing inconsistent valve closing at idle

D. A partially clogged PCV valve causing slight crankcase pressure at idle

27. A turbocharged engine reaches target boost of 15 psi at all RPM. Under sustained high-load operation the boost drops progressively to 9 psi over 3 minutes. No codes are stored. What should the technician suspect FIRST?

A. A wastegate actuator weakening under sustained thermal load and allowing early opening

B. An intercooler developing an internal restriction under thermal expansion

C. A boost pressure sensor drifting under sustained heat causing the PCM to reduce boost command

D. A turbocharger compressor wheel thermally expanding and reducing aerodynamic efficiency at temperature

28. A fuel-injected engine has a P0172 rich code. LTFT is -18% on both banks. Fuel pressure is normal. A bi-directional test commands all injectors off. Fuel trims immediately begin moving toward zero within 10 seconds. What does this confirm?

A. A vacuum leak is present — commanding injectors off reduces airflow and reveals the unmetered air

B. The MAF sensor is reading high — removing injector fuel delivery exposes the airflow calculation error

C. One or more fuel injectors are leaking and adding excess fuel when commanded off

D. The EVAP purge solenoid is stuck open — commanding injectors off eliminates its effect on trims

29. An engine has a fuel smell in the passenger compartment with no visible external leak and a negative EVAP smoke test. The fuel pressure regulator vacuum line is dry inside. What should the technician inspect NEXT?

A. The fuel tank seam and filler neck for a hairline crack allowing vapor migration into the cabin

B. The charcoal canister for saturation from excessive fuel vapor accumulation

C. The fuel injector O-rings for weeping fuel in the engine compartment that migrates into the cabin

D. The intake manifold for a fuel rail fitting that is slowly seeping fuel into the valley

29. An engine has a fuel smell in the cabin. No external leaks are visible, EVAP smoke test is negative, and the fuel pressure regulator vacuum line is dry. What should the technician inspect NEXT?

A. The fuel tank seam and filler neck for a hairline crack allowing vapor migration into the cabin

B. The charcoal canister for saturation

C. The fuel injector O-rings for weeping fuel migrating into the cabin

D. The fuel rail fittings at the intake manifold for slow seepage

30. A naturally aspirated engine misfires under hard acceleration only. Compression, leakage, and ignition are confirmed normal. Fuel pressure at idle is 57 psi but drops to 38 psi at WOT. Specification is 55 psi minimum. What is the MOST likely cause?

A. A clogged fuel filter restricting flow under high-demand acceleration

B. A weak fuel pump unable to sustain pressure under high-volume WOT demand

C. A pressure regulator stuck open bleeding excessive fuel under high-flow demand

D. A fuel supply line with an intermittent restriction under high-flow conditions

DOMAIN D — EMISSIONS CONTROL SYSTEMS (Questions 31–37)

31. A PCV system is tested. The PCV valve is removed and a finger is placed over the valve cover port. Strong vacuum is felt. The PCV valve rattles freely when shaken. Oil consumption is high with no external leaks. What should the technician suspect NEXT?

A. A clogged PCV fresh air inlet hose restricting makeup air flow into the crankcase

B. The PCV valve is stuck open drawing excessive oil vapor into the intake manifold

C. The intake manifold PCV port has carbon restriction limiting vacuum flow to the valve

D. The valve cover baffle has collapsed allowing liquid oil to be drawn through the PCV circuit

32. A vehicle has a P0300 random misfire and fails an emissions test for HC. No fuel trim codes are stored. LTFT is +1% on both banks. What is the MOST likely cause?

A. A lean air-fuel mixture causing random lean misfires and elevated HC

B. A rich condition from an injector leak causing random misfires on affected cylinders

C. A vacuum leak causing a lean condition sufficient to cause random misfires

D. An ignition system fault causing misfires and delivering unburned HC to the exhaust

33. A P0440 general EVAP system fault code is stored. No specific component codes are present. What is the MOST appropriate first diagnostic step?

A. Inspect and test the fuel cap for proper sealing before performing any other EVAP diagnosis

B. Perform a smoke machine test immediately to identify the leak location

C. Replace the EVAP purge solenoid as it is the most common cause of general EVAP faults

D. Test the fuel tank pressure sensor for a fault causing an incorrect system evaluation

34. A vehicle has a P0135 upstream O2 sensor heater circuit code on bank 1. The heater circuit fuse is confirmed good. Battery voltage is present at the heater supply wire. What should the technician check NEXT?

A. Replace the upstream O2 sensor as a confirmed supply voltage with a heater code always indicates sensor failure

B. Measure the resistance of the O2 sensor heater element and compare to specification

C. Test the PCM heater ground output circuit for an open preventing heater activation

D. Inspect the O2 sensor wiring harness for chafing near the exhaust manifold

35. A vehicle fails an emissions test for CO only. LTFT is -16% on both banks. No vacuum leaks are found. What is the MOST likely cause?

A. A rich air-fuel mixture from a fuel system or sensor fault producing elevated CO from incomplete combustion

B. An ignition misfire delivering unburned fuel that converts to CO in the exhaust

C. A partially degraded catalytic converter with reduced CO oxidation efficiency

D. A lean air-fuel mixture producing CO from incomplete combustion at the lean limit

36. A P0420 catalyst efficiency code is stored on a vehicle with 180,000 miles. No other codes are present. The downstream O2 sensor switches at the same rate as the upstream sensor. Fuel trims are normal. What is the MOST likely cause?

A. A slow upstream O2 sensor causing the PCM to misread catalyst efficiency

B. A downstream O2 sensor heater fault preventing accurate catalyst evaluation

C. A exhaust manifold leak upstream of the catalyst introducing oxygen and skewing results

D. Normal catalyst degradation from age and mileage reducing oxygen storage capacity

37. An AIR system is tested on cold start. The pump runs and check valves are confirmed open. The upstream O2 sensor shows no lean response during pump operation. The distribution tubes are confirmed intact. What is the MOST likely cause?

A. An AIR pump inlet filter blocked and restricting air volume output

B. The AIR pump delivering air to the exhaust but volume is insufficient to produce a detectable lean signal

C. The upstream O2 sensor has not reached operating temperature and cannot respond to the AIR-induced lean event

D. The AIR check valves are allowing air to flow but leaking exhaust backward simultaneously

DOMAIN E — COMPUTERIZED ENGINE CONTROLS INCLUDING OBD II (Questions 38–50)

38. A scan tool shows LTFT at +21% on bank 1 and +19% on bank 2 at idle. Both recover to +4% and +3% at 2,500 RPM. No vacuum leaks are found on smoke testing. What should the technician check NEXT?

A. The upstream O2 sensors on both banks for simultaneous contamination

B. The fuel pressure regulator for low pressure at idle affecting both banks

C. The MAF sensor for contamination causing a low airflow reading at idle

D. The EVAP purge solenoid for a closed fault preventing canister purging at idle

39. A P0301 cylinder 1 misfire code is stored. The cylinder 1 coil, plug, and injector have all been confirmed functional by component swap testing. Compression and leakage on cylinder 1 are normal. What should the technician check NEXT?

A. The PCM driver circuit for cylinder 1 for an intermittent open or high-resistance fault

B. The CMP sensor for an intermittent fault causing incorrect injection timing on cylinder 1 only

C. A vacuum leak specifically near the cylinder 1 intake port causing a lean misfire

D. The cylinder 1 plug wire for high resistance not detected during the swap test

40. A scan tool shows the downstream O2 sensor on bank 2 switching normally between 0.1 and 0.85 volts. The upstream O2 sensor on bank 2 is also switching normally. A P0430 catalyst efficiency code is stored. LTFT bank 2 is +2%. What does this indicate?

A. The downstream sensor is switching too rapidly confirming reduced catalyst oxygen storage capacity

B. A lean condition from the positive LTFT is causing elevated NOx and triggering the P0430

C. The downstream sensor heater has failed causing a false switching pattern

D. The downstream sensor switching at the same rate as the upstream sensor confirms the P0430 is valid

41. A vehicle has a P0455 large EVAP leak code. A smoke test identifies the leak at the purge solenoid outlet fitting. The fitting is tightened and the system is retested. No smoke exits during retesting. What should the technician do NEXT?

A. Clear the code and verify the EVAP monitor completes and passes on a subsequent drive cycle

B. Replace the purge solenoid as a leaking fitting indicates the solenoid body has also been stressed

C. Perform a fuel tank pressure sensor test before confirming the repair is complete

D. Replace the charcoal canister as the leak may have caused saturation during the fault period

42. A scan tool captures freeze frame data for a P0302 cylinder 2 misfire. Freeze frame shows ECT at 41°F, RPM at 850, and load at 12%. What do these conditions indicate about the misfire?

A. The misfire occurred during cold engine warm-up at idle under light load

B. The misfire occurred during hard acceleration on a cold engine

C. The misfire occurred at highway cruise speed on a partially warmed engine

D. The misfire occurred during deceleration fuel cutoff on a cold engine

43. A vehicle has STFT at +2% and LTFT at +3% on bank 1. STFT is +18% and LTFT is +16% on bank 2. No vacuum leak is found on bank 2. Fuel pressure is normal. What should the technician inspect NEXT?

A. The bank 2 upstream O2 sensor for slow response or contamination

B. The bank 2 fuel injectors for restriction reducing fuel delivery to bank 2 cylinders

C. The bank 1 upstream O2 sensor for contamination affecting bank 1 fuel trim accuracy

D. A vacuum leak specifically at the bank 2 throttle body base gasket

43. STFT is +2% and LTFT is +3% on bank 1. STFT is +18% and LTFT is +16% on bank 2. No vacuum leak found on bank 2. Fuel pressure is normal. What should the technician inspect NEXT?

A. The bank 2 upstream O2 sensor for slow response or contamination

B. The bank 2 fuel injectors for restriction

C. The bank 1 upstream O2 sensor for contamination

D. A vacuum leak at the bank 2 throttle body base gasket

44. A vehicle has a P0014 camshaft position actuator circuit fault on bank 1. The VVT system is commanded to advance camshaft timing on a scan tool bi-directional test. Actual cam timing does not change. Oil pressure is normal. What should the technician check NEXT?

A. The PCM VVT output driver circuit for a fault preventing solenoid activation

B. The VVT oil control solenoid for an open or short circuit preventing actuation

C. The cam phaser for internal wear preventing mechanical response to oil pressure changes

D. The camshaft position sensor for a fault causing incorrect feedback to the PCM

45. A scan tool shows all OBD II monitors complete after a recent battery replacement. The customer asks if the vehicle will pass an emissions inspection. What is the correct response?

A. No — the battery replacement reset the monitors and they must complete one full additional drive cycle before inspection

B. Yes — all monitors showing complete confirms the vehicle is ready for an emissions inspection

C. Possibly — some states require monitors to have been complete for a defined period before accepting results

D. No — a battery replacement always requires a dealer-level relearn before monitors are accepted for inspection

46. A P0507 high idle code is stored on a drive-by-wire vehicle. Actual idle is 950 RPM against a 650 RPM target. No vacuum leaks are found. The throttle body is clean. The PCM commands correct throttle position. What is the MOST likely cause?

A. The electronic throttle motor has a fault causing the throttle plate to rest slightly open beyond the commanded position

B. A PCM calibration fault commanding incorrect idle targets on this specific vehicle

C. A TPS fault reporting incorrect throttle position causing the PCM to misread idle

D. A MAP sensor fault causing the PCM to add more idle air than required

47. A vehicle has a P0300 random misfire. Live data shows all fuel trims normal, compression normal, and ignition confirmed on all cylinders. A scope test of all injector waveforms shows cylinder 4 injector pulse width dropping to zero intermittently for single firing events. What does this confirm?

A. The PCM is intentionally disabling the cylinder 4 injector intermittently as part of a misfire management strategy

B. A TPS fault causing the PCM to cut cylinder 4 injection during throttle transition events

C. The cylinder 4 injector driver circuit has an intermittent open causing missed injection events

D. The cylinder 4 injector has an intermittent internal short causing self-disable during operation

48. A scan tool shows the PCM has stored a permanent DTC for P0171 bank 1 lean. The bank 1 upstream O2 sensor has been replaced and a vacuum leak at the bank 1 intake manifold has been repaired. LTFT bank 1 is now +2%. What is required to clear the permanent DTC?

A. Use a scan tool to perform a code clear after confirming LTFT has returned to normal

B. Complete a full OBD II drive cycle with the bank 1 lean monitor passing after the repair

C. Disconnect the battery for 30 minutes to reset all PCM memory including permanent codes

D. Perform a PCM reflash to restore default calibration and clear the permanent DTC

49. A technician is diagnosing an intermittent stall with no stored codes. During a road test, the scan tool captures a moment where all sensor inputs read normally but RPM drops suddenly to zero. No CKP dropout is observed. What should the technician check NEXT?

A. The fuel pump for an intermittent output fault not captured by static pressure testing

B. A CAN bus fault causing momentary communication loss between sensors and the PCM

C. The PCM power supply for an intermittent voltage dropout causing a momentary processor reset

D. The upstream O2 sensor for an intermittent dropout causing the PCM to cut fuel delivery

50. A vehicle has completed all OBD II monitors with no codes stored. Mode 6 data shows the EVAP monitor test value at the borderline of the pass threshold. What is the MOST appropriate action?

A. Inform the customer the EVAP system is near its failure threshold and recommend inspection before the next emissions test

B. Clear the Mode 6 data and retest after a complete drive cycle to confirm the reading is repeatable

C. Replace the fuel cap proactively as it is the most common cause of near-threshold EVAP readings

D. Perform a smoke test immediately as a near-threshold EVAP result always indicates an active leak

PRACTICE EXAM 10: ANSWER KEY AND EXPLANATIONS

DOMAIN A — GENERAL DIAGNOSIS

1. **A. Normal vacuum behavior — manifold vacuum drops to near zero at wide-open throttle** — At wide-open throttle, the throttle plate is fully open and the pistons are no longer restricting airflow, eliminating the pressure differential that creates manifold vacuum. Vacuum collapsing to near zero under hard acceleration and recovering immediately when the throttle is released is the expected, normal response of a healthy engine. This pattern confirms the throttle, intake, and exhaust systems are all functioning correctly. An exhaust restriction would cause vacuum to drop progressively at sustained RPM rather than collapsing only under hard snap-throttle application.
2. **C. A blown head gasket between cylinders 2 and 3** — Two adjacent cylinders with equally low compression that shows no improvement on the wet test is the definitive diagnostic pattern of a head gasket failure between those two cylinders. The shared combustion pressure between adjacent cylinders bleeds equally from both, producing matching low readings. Oil addition cannot seal a gasket breach between two cylinders, explaining the absence of wet test improvement. Adjacent cylinder pairs with equal compression loss and no wet test response are the textbook presentation of an inter-cylinder gasket failure.
3. **B. A hydraulic timing chain tensioner bleeding down during shutdown** — A knock present only during the first 30 seconds of cold start that disappears as oil pressure builds points specifically to a component that relies on oil pressure for its function and loses it during extended shutdown. A hydraulic timing chain tensioner bleeds down when the engine sits, allowing chain slack to develop. On startup, the slack chain slaps against the timing cover until oil pressure recharges the tensioner and takes up the slack. Once pressure builds, the knock disappears completely and does not return until the next cold start.
4. **D. This is within the acceptable leakage range — no mechanical fault is indicated** — A cylinder leakage reading of 12% with no audible air escaping from any location is within the generally accepted specification of 20% or less for a serviceable engine. The absence of any audible leak path — no air at the throttle body, tailpipe, oil filler, or coolant — confirms no specific seal has failed. Minor leakage below the threshold limit is normal from imperfect ring sealing at static test conditions. No mechanical action is indicated based on this test result alone.
5. **C. Worn valve stem seals or oil control rings with normal compression** — Gray or bluish smoke at idle that increases under load with a burning oil smell, combined with normal compression and leakage readings, indicates oil is being consumed without a compression seal

failure. Worn valve stem seals allow oil to migrate down the valve stems into the combustion chamber without affecting compression testing, which measures dynamic ring seal. Worn oil control rings allow oil past the rings without significantly reducing compression readings if the compression rings themselves remain intact. Normal compression with oil consumption is the hallmark of a seal fault isolated to oil control rather than compression sealing.

6. **A. No internal or external cooling system leaks are present at the test pressure** — A cooling system pressure test that holds steady at 16 psi for 20 minutes with no drop confirms the system has no leak path that opens under the applied test pressure. Both internal and external leaks would cause pressure loss — a head gasket failure would allow pressurized coolant to enter the combustion chamber or oil passages, and any external hose, fitting, or component leak would cause a visible pressure drop. A stable pressure reading for the full test duration confirms the cooling system integrity at that pressure.
7. **D. Cylinder 4 has reduced compression offering less resistance to the starter** — A cylinder that cranks faster than all others during a relative compression test is offering less mechanical resistance to the starter on its compression stroke. Lower resistance means lower compression pressure — the piston encounters minimal air resistance as the rings, valves, or head gasket have failed to seal the cylinder. This result directs the technician to perform standard compression and leakage testing on cylinder 4 to quantify the compression loss and identify the specific leak path causing the reduced cranking resistance.
8. **B. Worn valve stem seals allowing oil to be drawn into all cylinders consistently** — Persistent blue smoke under all driving conditions with normal compression and leakage on all cylinders narrows the oil consumption path to the valve stems rather than the rings. Worn valve stem seals allow oil to migrate past the seals into the intake ports under intake manifold vacuum, which is present at all operating conditions — not just deceleration. This creates continuous oil consumption visible as persistent blue smoke regardless of throttle position or load, while ring seal integrity remains sufficient to produce normal compression and leakage test results.
9. **C. Exhaust restriction causing backpressure to push the vacuum reading above baseline on recovery** — During a snap-throttle test, the sudden RPM increase followed by a brief reading above the original idle baseline before settling back is the specific indicator of exhaust restriction. When the throttle snaps open and engine speed increases rapidly, exhaust backpressure briefly builds behind the restriction. As the throttle closes and RPM begins to fall, this trapped backpressure momentarily pushes the vacuum gauge needle above the original idle reading before normalizing. This overshoot above baseline on recovery is the diagnostic signature of restricted exhaust flow.
10. **D. The head gasket for a failure allowing coolant to enter the oil passages** — Milky, tan-colored oil confirming coolant contamination requires identifying the internal path that allowed coolant and oil to mix. While multiple paths exist — oil cooler, intake manifold gasket, cylinder head, and head gasket — the head gasket is statistically the most common cause of coolant entering the oil

on most engine designs. It represents the most direct boundary between the cooling system and oil passages and is the highest-priority item to evaluate first. After ruling out or confirming the head gasket, other paths can be investigated in order of likelihood.

11. **C. A large vacuum leak that has greater effect at idle than at higher RPM** — A vacuum reading significantly below normal at idle that improves substantially as RPM increases is the classic pattern of a large vacuum leak. At idle, the throttle is nearly closed and the engine's pumping action creates strong manifold vacuum. A large leak introduces a significant volume of unmetered air relative to the small throttle opening, dramatically reducing vacuum. As RPM increases and the throttle opens wider, the proportional impact of the fixed leak volume decreases relative to total airflow, allowing vacuum to approach more normal levels at higher engine speeds.
12. **B. A failed CKP sensor causing the PCM to default to a fixed TDC timing strategy** — All systems are confirmed functional — spark, fuel pressure, injector pulse, and compression are all verified. The specific finding of a timing light showing no spark advance at any cranking speed, with spark always firing at TDC, points to the PCM defaulting to a fixed base timing strategy. This default occurs when the PCM cannot calculate timing advance from a missing or corrupt CKP signal. Without crank position data, the PCM cannot determine engine speed or position accurately enough to advance timing and defaults to TDC firing to allow limited starting capability.

DOMAIN B — IGNITION SYSTEM DIAGNOSIS AND REPAIR

13. **D. Physical damage from improper installation torque or dropping the plug** — A cracked porcelain insulator with no electrode wear, no deposits, and no thermal discoloration indicates the damage was mechanical rather than combustion-related. Pre-ignition thermal damage would show electrode erosion and insulator blistering alongside the crack. Normal wear would show electrode rounding and gap widening. A clean crack with no other signs of abnormal combustion or long-service wear is the result of physical shock — either over-torquing during installation, under-torquing allowing the plug to vibrate loose, or dropping the plug before installation.
14. **A. The coil originally on cylinder 3 has failed** — The misfire code moved from P0303 on cylinder 3 to P0306 on cylinder 6 after the coil swap, confirming the fault traveled with the coil from its original position to its new location. The spark plug, fuel injector, and PCM driver circuit for cylinder 3 all remained in place while the misfire moved — only the coil was relocated, and the misfire followed it. This component-swap confirmation is the definitive method for identifying a failed coil in a COP system and eliminates all other cylinder-specific components from consideration.
15. **B. Dwell time is too short — the coil is firing before full magnetic saturation** — A primary waveform showing a normal current ramp that is cut short before reaching peak saturation indicates the PCM is triggering the coil to fire before the primary winding has stored its maximum magnetic field energy. This results in a weak spark with reduced secondary voltage output because the coil's energy reservoir was not fully charged at the moment of firing. Short dwell time is most commonly

caused by a PCM programming fault, a high RPM condition where dwell management is aggressive, or a CKP signal fault that is causing the PCM to miscalculate dwell duration.

16. **C. A shorted or fouled spark plug that cannot sustain an arc across the gap** — A normal firing line indicates sufficient voltage was produced to initiate the arc. The immediate collapse to the oscillation section with no spark line duration means the arc was initiated but could not be sustained — the electrical path across the gap collapsed almost instantly. A shorted or severely fouled plug provides a near-zero resistance path that allows current to flow without sustaining a true arc. The firing line is present because voltage was sufficient to overcome the initial gap resistance, but the short-circuit condition prevents the normal sustained burn that produces the spark line.

17. **D. A failed sensor — with reference voltage confirmed, an all-zero signal output indicates internal sensor failure** — Reference voltage is confirmed at 5 volts at the sensor connector, confirming the PCM reference circuit and connector are intact and delivering correct voltage to the sensor. A Hall effect sensor requires reference voltage, ground, and internal switching to produce its output signal. With reference voltage confirmed externally, the absence of any output signal during cranking — when the reluctor wheel is passing the sensor at sufficient speed — confirms the sensor's internal Hall effect element has failed and is not producing switching output despite receiving correct reference voltage.

18. **B. The plug wire originally on the misfiring cylinder has high resistance** — The misfire moved from the original cylinder to the new cylinder after the plug wire swap, confirming the fault traveled with the wire to its new location. The spark plug, distributor cap terminal, and ignition coil remained associated with the original cylinder while the misfire moved to the new location — only the plug wire changed positions. When a fault follows a swapped component to its new location, that component is definitively confirmed as the cause. A high-resistance plug wire limits secondary current delivery and causes a misfire on whichever cylinder it serves.

19. **A. An intermittent open or short in the CKP sensor circuit causing total signal loss** — A waveform that is completely normal at all times except for periodic 0.5-second intervals of total signal loss — a completely flat line — indicates the signal is being interrupted entirely rather than degrading gradually. A faulty sensor producing a weak signal would show reduced amplitude. A reference gap would produce a brief dropout, not a sustained 0.5-second flat section. Intermittent total signal loss of this duration and repeatability points to an intermittent open or short circuit in the sensor wiring, connector, or sensor body that periodically interrupts the complete signal path.

20. **B. One cylinder fires on its exhaust stroke while the other fires on its compression stroke** — In a waste spark ignition system, one coil serves two cylinders that are 360 degrees apart in the firing order — one on its compression stroke and one on its exhaust stroke simultaneously. The plug on the compression stroke fires the productive spark that ignites the air-fuel mixture. The plug on the exhaust stroke fires a wasted spark into an already-burned cylinder with minimal resistance.

Both plugs fire simultaneously from the same coil discharge event, with one delivering useful ignition energy and the other dissipating its spark harmlessly into the exhaust gases.

DOMAIN C — FUEL, AIR INDUCTION, AND EXHAUST SYSTEMS

21. **D. Normal pressure drop — return-style systems always show lower pressure at idle than at key-on** — On a return-style fuel system, the pressure regulator uses intake manifold vacuum to reduce rail pressure below the regulator's spring pressure setting during idle conditions. At key-on with no engine running and no manifold vacuum applied, pressure builds to the full spring pressure setting. At idle with vacuum applied to the regulator, pressure appropriately drops to the lower vacuum-referenced value. A pressure of 48 psi at idle with 62 psi at key-on on a system specified at 58 psi with vacuum applied confirms the regulator is functioning exactly as designed.

22. **A. A MAF sensor reading high causing the PCM to over-deliver fuel** — A MAF reading nearly double the specified idle value combined with strongly negative LTFT on both banks is the definitive pattern of a MAF sensor reporting significantly more airflow than is actually occurring. The PCM calculates fuel delivery based on the measured airflow signal — an inflated airflow reading results in excess fuel being commanded. The PCM's negative LTFT corrections confirm it is detecting and compensating for the resulting rich condition. The P0101 performance code sets because the MAF reading falls outside the expected range for the current operating conditions.

23. **C. The injectors for leaking — fuel pressure holds but vapor lock may develop in the hot rail** — Fuel pressure holds at 54 psi for 30 minutes after hot shutdown, eliminating the check valve, pressure regulator, and pump output as pressure-related causes. When pressure is confirmed holding but a hot-start problem persists, the issue is not pressure loss but fuel state. Leaking injectors allow small amounts of fuel to dribble into hot combustion chambers after shutdown, where the residual engine heat vaporizes the accumulated fuel in the rail and injector tips. On the next hot start, the injectors must purge vapor before liquid fuel delivery resumes, requiring extended cranking.

24. **B. The TPS is functioning correctly — 0.45 to 4.55 volts is a normal sweep range** — A TPS sweeping smoothly from 0.45 volts at closed throttle to 4.55 volts at wide-open throttle represents a correct and complete voltage sweep within the 0–5 volt reference range. Standard TPS specifications allow idle voltage between 0.3 and 0.8 volts with WOT voltage between 4.2 and 4.8 volts on most systems. These readings fall squarely within normal operating range. If a P0123 high input code is stored with these readings, the code was likely set during a previous fault condition and the current sensor operation is correct — the stored code should be cleared and the system retested.

25. **D. A worn or failing high-pressure mechanical fuel pump** — The low-pressure pump is confirmed delivering adequate supply pressure to the high-pressure pump inlet. With correct low-pressure supply confirmed, a GDI high-pressure rail reading of 450 psi against a 1,500 psi idle specification points directly to the cam-driven high-pressure mechanical pump as the fault. This

pump is responsible for compressing fuel from the 60–65 psi low-pressure supply to the 1,500–2,200 psi required for direct injection. A worn pump lobe, collapsed pump follower, or worn pump internal components prevent the pressure multiplication required for GDI operation despite adequate low-pressure supply.

26. **B. A small vacuum leak at the intake manifold base** — Vacuum of 17 in/Hg at idle that improves to 19 in/Hg at 2,500 RPM, combined with a propane enrichment test that noticeably improves idle quality near the intake manifold base, directly confirms a small vacuum leak at that location. The propane test is the key confirming test — propane drawn into the leak point temporarily compensates for the unmetered air, enriching the mixture toward stoichiometry and improving idle quality and stability. The vacuum improvement with RPM is consistent with the leak having proportionally less effect as throttle opening increases.

27. **A. A wastegate actuator weakening under sustained thermal load** — Boost that reaches and maintains target pressure initially but drops progressively over several minutes of sustained high-load operation points to a component that functions correctly when cold but degrades under sustained thermal stress. A wastegate actuator diaphragm that softens or weakens under prolonged heat exposure begins opening the wastegate earlier than commanded, bleeding off boost pressure progressively as the actuator reaches its thermal limit. The gradual nature of the pressure drop over minutes distinguishes this from a sudden boost leak and the thermal correlation distinguishes it from a mechanical fault present at all temperatures.

28. **C. One or more fuel injectors are leaking and adding excess fuel when commanded off** — Commanding all injectors off is a bi-directional test that eliminates fuel delivery as a variable. If the rich condition — evidenced by the -18% LTFT — is caused by leaking injectors, removing the injector command stops the leaking fuel delivery and trims immediately begin recovering toward zero. This response confirms the excess fuel was coming through the injectors. A MAF fault would not respond to injector disable because the airflow measurement error would continue regardless of injector state. A stuck-open purge solenoid would continue adding vapor with injectors disabled.

29. **C. The fuel injector O-rings for weeping fuel migrating into the cabin** — No external leaks are visible, the EVAP smoke test is negative confirming the EVAP system is intact, and the fuel pressure regulator vacuum line is dry eliminating the regulator as a source. A fuel smell in the cabin with no detectable external or EVAP leak points to a small fuel seepage source in the engine compartment that is not under EVAP system monitoring. Weeping fuel injector O-rings allow small amounts of liquid fuel to seep into the intake valley area near the firewall. Fuel vapors from this seepage can migrate into the passenger compartment through cabin air intake paths without being detectable as a visible leak or EVAP system fault.

30. **B. A weak fuel pump unable to sustain pressure under high-volume WOT demand** — Fuel pressure is correct at idle, confirming the pump can build adequate static pressure at low demand. The pressure drop to 38 psi specifically at WOT — when fuel demand is highest — with misfires occurring only under that condition confirms a volume-limited pump fault. A pump that maintains

idle pressure while failing under maximum flow demand is the classic pattern of a worn pump impeller that can generate adequate pressure against a low-flow load but cannot sustain the flow volume required at wide-open throttle. A clogged filter would typically also reduce idle pressure to some degree.

DOMAIN D — EMISSIONS CONTROL SYSTEMS

31. **B. The PCV valve is stuck open drawing excessive oil vapor into the intake manifold** — Strong vacuum at the valve cover port confirms the intake manifold vacuum circuit is clear and drawing correctly. The PCV valve rattling freely confirms it is not stuck closed. However, high oil consumption with no external leaks despite a confirmed vacuum source points to excessive oil vapor being drawn through the PCV circuit into the intake manifold. A PCV valve stuck in the fully open position bypasses its flow-limiting function, allowing unrestricted crankcase vacuum that draws oil vapor and oil mist at a higher rate than the engine can tolerate, causing abnormal oil consumption without external drips or visible smoke.

32. **D. An ignition system fault causing misfires and delivering unburned HC** — A P0300 random misfire with elevated HC at the tailpipe and near-neutral fuel trims on both banks eliminates a mixture fault as the misfire cause. Neutral LTFT confirms the engine is receiving correct stoichiometric fuel delivery — no lean or rich bias is present. An ignition fault — a degraded coil, worn spark plug, or high-resistance plug wire — causes intermittent combustion failure that delivers complete unburned fuel charges directly to the exhaust and catalyst. The neutral fuel trims combined with elevated HC and a random misfire code is the definitive pattern of an ignition-sourced misfire.

33. **A. Inspect and test the fuel cap before any other EVAP diagnosis** — A P0440 general EVAP system code without specific component codes indicates a system-level fault has been detected but has not been isolated to a specific component by the monitor. The fuel cap is the most common single cause of general EVAP codes — it is the most frequently removed and reinstalled component of the EVAP system and its seal degrades with age and repeated use. Inspecting and pressure-testing the cap costs nothing and takes minutes. Finding and correcting a cap fault at the first step eliminates the need for smoke testing, component replacement, or further diagnosis in the majority of P0440 cases.

34. **C. Test the PCM heater ground output circuit for an open preventing heater activation** — The heater fuse is confirmed good and battery supply voltage is confirmed at the heater supply wire, confirming the power side of the heater circuit is intact. An O2 sensor heater circuit operates by the PCM providing a switched ground path to complete the heater circuit. With supply voltage confirmed, the remaining fault possibilities are either an open in the PCM ground output or an open in the sensor heater element itself. Testing the PCM ground output circuit confirms whether the PCM is completing the circuit before the heater element resistance is measured.

35. **A. A rich air-fuel mixture producing elevated CO from incomplete combustion** — Elevated CO at the tailpipe with strongly negative LTFT on both banks confirms a persistent rich air-fuel mixture. CO is produced when combustion occurs with insufficient oxygen to completely oxidize all carbon atoms to CO_2. A rich mixture provides excess fuel relative to available oxygen, causing a portion of the fuel carbon to produce CO rather than CO_2. The negative LTFT confirms the PCM is detecting and attempting to correct the rich condition — but the underlying fuel delivery or sensor fault is producing more richness than the closed-loop system can fully compensate for, resulting in CO reaching the tailpipe.

36. **D. Normal catalyst degradation from age and mileage reducing oxygen storage capacity** — A downstream O2 sensor switching at the same rate as the upstream sensor on a high-mileage vehicle with normal fuel trims and no other codes is the straightforward presentation of a catalyst that has exhausted its oxygen storage capacity through normal use. A healthy catalyst stores oxygen during lean excursions and releases it during rich excursions, dampening the downstream sensor's switching relative to the upstream. When the washcoat is depleted, the catalyst can no longer buffer oxygen changes and the downstream sensor mirrors the upstream pattern — confirming chemical degradation rather than contamination or sensor fault.

37. **A. An AIR pump inlet filter blocked and restricting air volume output** — The pump runs, check valves are confirmed open, and distribution tubes are intact — the mechanical delivery path is fully functional. However, the upstream O2 sensor shows no lean response despite confirmed air delivery path integrity. The absence of a lean signal when all downstream components are confirmed open indicates insufficient air volume is actually reaching the exhaust ports. A blocked pump inlet filter restricts the volume of atmospheric air entering the pump, reducing its output below the threshold needed to produce a detectable lean signal at the upstream O2 sensor despite all downstream components functioning correctly.

DOMAIN E — COMPUTERIZED ENGINE CONTROLS INCLUDING OBD II

38. **C. The MAF sensor for contamination causing a low airflow reading at idle** — Strongly positive LTFT on both banks at idle that recovers significantly at higher RPM is the specific pattern of a MAF sensor reading low at idle airflow rates but becoming more accurate as airflow increases. A contaminated MAF hot wire element that has deposits accumulated on its sensing wire underestimates actual airflow most severely at low airflow rates — the contamination has its greatest proportional effect when the signal level is lowest. As airflow increases at higher RPM, the higher signal level is less affected proportionally by the fixed contamination, allowing trims to recover toward zero.

39. **A. The PCM driver circuit for cylinder 1 for an intermittent open or high-resistance fault** — All cylinder-specific components — coil, plug, and injector — have been confirmed functional by swap testing, and compression and leakage are normal. With every component that can be swapped and tested confirmed good, the fault must be in the fixed circuit that cannot be swapped — the PCM driver circuit for cylinder 1. An intermittent open or high-resistance fault in the PCM output

driver, the wiring between the PCM and the coil, or the ground path for that specific circuit would cause intermittent misfires that remain on cylinder 1 regardless of which components are installed.

40. **D. The downstream sensor switching at the same rate as the upstream sensor confirms the P0430 is valid** — A healthy catalytic converter with adequate oxygen storage capacity dampens downstream O2 sensor switching relative to upstream switching — the downstream sensor should switch more slowly and with less amplitude than the upstream. When both sensors switch at the same rate and amplitude, the converter is no longer buffering exhaust oxygen content changes, confirming its oxygen storage capacity is depleted. The near-neutral LTFT eliminates a fuel system fault as the cause of the P0430, and the equal switching pattern between upstream and downstream sensors confirms the code is a valid catalyst efficiency failure.

41. **A. Clear the code and verify the EVAP monitor completes and passes** — The specific leak has been identified, repaired, and confirmed sealed by retesting with the smoke machine — the repair is complete. The next required step is confirming that the OBD II EVAP monitor now runs and passes after the repair, which clears the stored code from the PCM and confirms the system meets the monitor's pass criteria under actual operating conditions. Replacing additional components without evidence of their involvement in the confirmed and repaired fault wastes parts. Smoke test confirmation of no remaining leaks is the repair verification — monitor completion is the final confirmation.

42. **A. The misfire occurred during cold engine warm-up at idle under light load** — Freeze frame ECT at 41°F confirms the engine was very cold — well below operating temperature. RPM at 850 indicates idle speed. Engine load at 12% confirms minimal power demand — consistent with a cold idle condition. Together these parameters describe a cold engine sitting at idle during the early warm-up phase, before closed-loop fuel control is active and before the engine has reached operating temperature. Cold idle misfires with these freeze frame conditions direct the diagnosis toward cold-specific causes — enrichment faults, cold-sensitive ignition components, or IAC operation during warm-up.

43. **B. The bank 2 fuel injectors for restriction reducing fuel delivery** — Bank 1 fuel trims are near zero — confirming normal fuel control on bank 1. Bank 2 shows substantially elevated STFT and LTFT with no vacuum leak found and normal fuel pressure. With the O2 sensor circuit, vacuum, and fuel pressure eliminated, a fuel delivery fault specific to bank 2 cylinders is the remaining cause. Restricted fuel injectors on bank 2 deliver less fuel than commanded on each injection event, creating a persistent lean condition that the PCM compensates for with elevated positive fuel trims. An injector balance test comparing bank 2 injectors against bank 1 will identify the restricted cylinder or cylinders.

44. **B. The VVT oil control solenoid for an open or short circuit** — A P0014 actuator circuit code combined with a bi-directional test confirming the cam timing does not respond to command identifies a fault between the PCM command and the mechanical phaser. Oil pressure is confirmed normal, eliminating oil supply as the cause of non-response. The oil control solenoid is the

electrical-to-hydraulic interface between the PCM command and the cam phaser. An open or short in the solenoid winding prevents it from directing oil pressure to the phaser regardless of PCM command. Testing solenoid resistance and command circuit voltage confirms whether the solenoid is receiving and responding to the PCM output before the phaser itself is inspected.

45. **B. Yes — all monitors showing complete confirms the vehicle is ready for an emissions inspection** — All OBD II monitors completing successfully after a battery replacement confirms the vehicle has completed the required drive cycles, all system monitors have run and passed their evaluation criteria, and no fault conditions were detected during the monitoring process. A vehicle with all monitors complete and no stored codes has satisfied the OBD II readiness requirements for emissions inspection. The battery replacement itself does not impose any additional waiting period beyond completing the standard drive cycle monitors, which are now confirmed complete.

46. **A. The electronic throttle motor has a fault causing the throttle plate to rest slightly open** — No vacuum leaks, a clean throttle body, and the PCM commanding correct throttle position eliminate the most common causes of high idle. On a drive-by-wire system, the PCM commands the throttle motor to a specific position and monitors actual position through the TPS. If the throttle motor has a fault causing it to rest at a slightly open position beyond what the PCM commands, idle speed will be elevated beyond target because additional unthrottled air is entering the engine. The PCM cannot correct for a throttle plate that physically cannot reach its commanded closed position.

47. **C. The cylinder 4 injector driver circuit has an intermittent open causing missed injection events** — All fuel trims, compression, and ignition are confirmed normal, and the random misfire pattern points to a single-cylinder intermittent fault. A scope test directly capturing the injector pulse width dropping to zero intermittently on cylinder 4 confirms the injector is not receiving its firing command on those events. The PCM does not intentionally disable single injectors intermittently as a misfire management strategy — that response would appear as a sustained disable, not a random single-event dropout. An intermittent open in the PCM driver circuit or injector wiring is the cause of the single missed injection events.

48. **B. Complete a full OBD II drive cycle with the bank 1 lean monitor passing** — Permanent DTCs are a specific OBD II code category that cannot be cleared by a scan tool command or battery disconnection. They were introduced specifically to prevent technicians from clearing codes immediately before an emissions inspection without performing the actual repair. A permanent DTC can only be cleared by the PCM itself after the vehicle completes a full OBD II drive cycle, the relevant monitor runs and passes its evaluation criteria, and the PCM confirms the fault condition no longer exists. Confirming LTFT has returned to +2% and completing the monitor pass cycle is the only valid method to clear a permanent DTC.

49. **C. The PCM power supply for an intermittent voltage dropout causing a momentary processor reset** — All sensor inputs reading normally at the moment of stall with no CKP dropout eliminates sensor faults and most circuit faults as the cause. A stall where all inputs appear correct

but RPM drops suddenly to zero suggests the PCM itself experienced a fault — specifically a momentary loss of operating power causing it to reset. When the PCM loses power momentarily, it stops processing all engine management functions simultaneously, causing an instant stall. The scan tool captures normal sensor data because the sensors were functional — the PCM simply stopped processing and commanding outputs for the duration of the voltage dropout.

50. **A. Inform the customer the EVAP system is near its failure threshold** — Mode 6 data showing an EVAP monitor test value at the borderline of the pass threshold indicates the EVAP system is still passing its monitor evaluation but is approaching the failure limit. This is exactly the type of predictive information Mode 6 is designed to provide — identifying gradual degradation before it becomes a confirmed fault code. The appropriate response is to inform the customer of the near-threshold finding, recommend an EVAP system inspection before the next scheduled emissions test, and allow the customer to make an informed decision about proactive service rather than waiting for a code to set.