PRACTICE EXAM 17: A9 LIGHT VEHICLE DIESEL ENGINES SIMULATION (60 QUESTIONS)

1. A diesel produces a sharp metallic knock at idle that grows under load, and oil pressure is slightly low. The MOST likely cause is:

A. worn crankshaft main or rod bearings

B. a glow plug that has failed open on one cylinder

C. a fuel/water separator overdue for draining

D. a thermostat that is stuck in the open position

2. A diesel's high-pressure common rail acts as an accumulator that:

A. cools the fuel before it returns to the tank

B. filters water out of the incoming diesel fuel

C. stores pressurized fuel ready for each injection

D. recirculates exhaust gas into the intake charge

3. A diesel with a sticking VGT shows boost that surges and falls. After cleaning, the technician should also:

A. raise the commanded rail pressure inside the ECM

B. flush the cooling system and replace the coolant

C. replace the full set of high-pressure injectors

D. verify free vane movement through the full range

4. A diesel's oil level is over the full mark and the oil smells of fuel. The MOST likely cause is:

A. fuel dilution from a leaking or dribbling injector

B. coolant intrusion through a failed oil cooler

C. normal soot accumulation from combustion

D. condensation building up from short-trip driving

5. A diesel's EGR system lowers NOx by recirculating exhaust, which works because the exhaust gas:

A. adds oxygen that completes the combustion

B. raises the peak combustion temperature

C. is inert and lowers peak combustion temperature

D. carries ammonia to react with the NOx

6. A diesel's injector is removed and pop-tested, opening well below its specified pressure. This injector will MOST likely:

A. fail to inject any fuel into the cylinder

B. raise the rail pressure above the commanded value

C. inject too early and disturb combustion timing

D. cause coolant to enter the engine oil supply

7. A diesel's exhaust system uses a diesel oxidation catalyst. The DOC requires which condition to work effectively?

A. a full diesel exhaust fluid tank at all times

B. exhaust gas recirculation flowing at idle

C. the engine running below operating temperature

D. exhaust temperature high enough to light off the catalyst

8. A diesel's cylinder head is checked for flatness and found warped beyond the limit. The correct repair is to:

A. install two head gaskets stacked to fill the gap

B. resurface the head within specification or replace it

C. torque the head bolts much higher to seal the gap

D. apply a thick bead of RTV across the warped area

9. A diesel's lift pump supplies the high-pressure pump. A leaking suction line ahead of the lift pump will MOST likely cause:

A. air in the fuel, hard starting, and rough running

B. coolant contamination of the engine oil supply

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

10. A diesel's coolant temperature rises rapidly right after start and the upper hose stays cold. The MOST likely cause is a:

A. radiator clogged with external road debris

B. fan clutch that fails to engage when hot

C. water pump leaking from its weep hole

D. thermostat stuck in the closed position

11. A diesel's piston ring set includes an oil control ring. Its primary job is to:

A. seal combustion pressure above the piston

B. scrape excess oil from the cylinder wall

C. transfer heat from the piston to the head

D. center the piston pin within its bore

12. A diesel's DEF dosing line is clogged with crystals. The MOST likely result is:

A. a no-crank condition at the starter motor

B. excessively high common-rail fuel pressure

C. coolant contamination of the engine oil supply

D. poor NOx conversion and an SCR-related fault code

13. A diesel's high-pressure pump produces metal debris that contaminates the entire fuel system. After replacing the pump, the technician MUST also:

A. clean or replace the rail, lines, and injectors as needed

B. raise the commanded boost target inside the ECM

C. flush the cooling system and replace the coolant

D. reprogram the glow plug controller for cold starts

14. A diesel's compression test reads low on one cylinder, and oil added to that cylinder does not raise the reading. This indicates a:

A. set of worn piston rings in that cylinder

B. leaking or burned valve in that cylinder

C. dribbling fuel injector in that cylinder

D. clogged air filter restricting that cylinder

15. A diesel's intake air temperature sensor is part of the control strategy because intake air temperature affects:

A. the diesel exhaust fluid dosing rate

B. the battery charging voltage at idle

C. air density and the fueling the ECM commands

D. the exhaust back-pressure across the DPF

16. A diesel's turbocharger oil supply line is partially blocked. The MOST likely result is:

A. coolant contamination of the engine oil supply

B. turbo bearing damage from inadequate lubrication

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

17. A diesel's glow plugs are wired through a control module. A module that never energizes the plugs will cause:

A. the plugs to overheat and burn out quickly

B. excessively high common-rail fuel pressure

C. coolant contamination of the engine oil supply

D. hard cold starting and white smoke until warm

18. A diesel's fuel filter housing has a primer and a vent screw. After changing the filter, the technician uses these to:

A. raise the cetane number of the fuel for starting

B. cool the fuel before it reaches the injectors

C. program the injector calibration codes into the ECM

D. prime the system and bleed out trapped air

19. A diesel's connecting rod is reinstalled, and the bearing crush provides:

A. clearance for oil to drain back to the sump

B. a tight grip that holds the bearing and aids heat transfer

C. room for the rod to float on the crankpin

D. space for the piston pin to expand when hot

20. A diesel's EGR cooler develops an internal leak. Besides coolant loss, a likely symptom is:

A. excessively high boost at low engine speed

B. white smoke and coolant entering the intake/exhaust

C. a no-crank condition at the starter motor

D. overcharging of the vehicle's starting batteries

21. A diesel's exhaust temperature sensors feed the ECM during regeneration so it can:

A. set the alternator charging output voltage

B. control the high pressure delivered to the rail

C. manage the burn and protect the aftertreatment from overheating

D. meter the diesel exhaust fluid into the tank

22. A diesel's crankshaft journal is measured and found out-of-round beyond the limit. The correct repair is to:

A. install a thicker bearing to take up the difference

B. regrind the journal and fit undersize bearings

C. increase the oil pressure to compensate for it

D. add a shim behind the bearing insert to center it

23. A diesel's boost pressure is normal but the engine still lacks power and runs hot in the exhaust. A logical check is the:

A. battery state of charge and cable connections

B. cabin HVAC blower motor and resistor pack

C. diesel exhaust fluid level in its storage tank

D. exhaust for a restriction such as a plugged DPF

24. A diesel's wet cylinder liners are being installed. Correct liner protrusion (stand-out) above the deck ensures:

A. proper camshaft-to-crankshaft valve timing

B. the correct valve-spring installed height

C. adequate fuel injector return flow

D. head-gasket sealing and prevention of leaks

25. A diesel's fuel returns to the tank far hotter than normal, and power drops on long hot pulls. A likely cause is a:

A. failed or bypassed fuel return cooler

B. thermostat stuck in the closed position

C. glow plug control module that has failed open

D. cabin HVAC blower drawing excessive current

26. A diesel's injector calibration code is required after replacement so the ECM can:

A. count the total injection events over the life

B. measure the temperature of the returning fuel

C. correct for that injector's exact flow characteristics

D. disable the cylinder if the injector fully fails

27. A diesel's turbocharger produces a loud whine and slow boost response, and the shaft has excessive play. The correct repair is to:

A. raise the commanded boost target inside the ECM

B. clean the intake tract and reinstall the same turbo

C. replace the turbocharger with the worn bearings

D. reprogram the injector calibration codes in the ECM

28. A diesel's piston cooling jets spray the underside of the pistons. If oil pressure drops too low, these jets:

A. may stop spraying, risking piston overheating

B. raise the boost the turbocharger can produce

C. cause coolant to enter the engine oil supply

D. meter diesel exhaust fluid into the exhaust

29. A diesel's water-in-fuel sensor warns the driver. Water in diesel is harmful mainly because it:

A. corrodes and damages high-pressure fuel components

B. raises the cetane number of the fuel too high

C. plugs the diesel particulate filter with soot

D. increases the sulfur content of the fuel

30. A diesel's EGR valve sticks closed and a NOx code sets. The technician confirms combustion temperature is high. The repair is to:

A. raise the commanded rail pressure inside the ECM

B. free or replace the EGR valve so it opens again

C. command a forced particulate filter regeneration

D. reprogram the injector calibration codes in the ECM

31. A diesel's oil pressure relief valve limits maximum oil pressure. If it sticks open, the result is:

A. oil pressure that never relieves at high rpm

B. coolant contamination of the engine oil supply

C. low oil pressure because oil is dumped too early

D. a stuck-open exhaust gas recirculation valve

32. A diesel's compression is low and even on all cylinders with heavy blow-by past the breather. The engine MOST likely needs:

A. ring and cylinder service for general wear

B. a single injector replaced on one cylinder

C. the cooling system flushed and refilled

D. the diesel exhaust fluid tank refilled

33. A diesel's serpentine belt has thrown chunks and the charging warning is on. Before installing a new belt, the technician should:

A. raise the commanded rail pressure inside the ECM

B. command a forced particulate filter regeneration

C. reprogram the injector calibration codes in the ECM

D. inspect the pulleys and tensioner for the cause

34. A diesel's coolant has air pockets after a repair, causing erratic temperature readings and hot spots. The fix is to:

A. install a higher-rated radiator pressure cap

B. replace the thermostat with a hotter one

C. properly bleed the trapped air from the system

D. add a bottle of cooling-system stop-leak

35. A diesel's fuel pressure regulator on the high-pressure pump is commanded by the ECM. Its job is to:

A. set the glow plug on-time during cold starts

B. open the wastegate to limit turbocharger boost

C. control rail pressure by metering fuel into the pump

D. meter diesel exhaust fluid into the SCR catalyst

36. A diesel runs slightly cool, gives poor heat, and has reduced fuel economy. The MOST likely cause is a:

A. thermostat stuck in the open position

B. head gasket leaking combustion gas into coolant

C. water pump impeller loose on its shaft

D. radiator clogged with external road debris

37. A diesel's camshaft is gear-driven and the timing is off after service. The MOST likely symptom is:

A. coolant contamination of the engine oil supply

B. overcharging of the vehicle's starting batteries

C. a no-crank condition at the starter motor

D. poor running, low power, and hard starting

38. A diesel's high-pressure fuel lines were disconnected for service. On many engines these lines should be:

A. cleaned and reused with the old sealing washers

B. heated to relieve stress and then reinstalled

C. replaced with new lines to ensure a proper seal

D. swapped between cylinders to even out wear

39. A diesel's NOx sensor downstream of the SCR reads nearly the same as the upstream sensor. This indicates the:

A. particulate filter is loaded with excess soot

B. catalyst is not reducing NOx as it should

C. glow plugs are failing on cold starts

D. turbocharger is producing too little boost

40. A diesel's valve seat is recut too deep, sinking the valve into the head. This MOST likely reduces:

A. the cylinder bore taper at the top

B. the connecting-rod side clearance

C. the camshaft lobe lift value

D. the installed valve-spring height and pressure

41. A diesel's turbocharger should idle briefly before shutdown after towing because:

A. it raises the cetane number of the remaining fuel

B. it recharges the batteries before the engine stops

C. it completes a diesel particulate filter regeneration

D. it lets the bearings cool so the oil does not coke

42. A diesel's intake grid heater stays on too long after start. The MOST likely cause is a:

A. relay stuck closed or a faulty control module

B. thermostat stuck in the wide-open position

C. high-pressure fuel pump worn beyond spec

D. cabin HVAC blower drawing excessive current

43. A diesel's oil cooler is the oil-to-coolant type and develops an internal leak. The MOST likely result is:

A. a no-crank condition at the starter motor

B. cross-contamination of the oil and coolant

C. excessively high common-rail fuel pressure

D. a permanently plugged diesel particulate filter

44. A diesel's compression varies between cylinders, and the lowest reading improves when oil is added. That cylinder MOST likely has:

A. a leaking or burned valve

B. worn or broken piston rings

C. a cracked cylinder head

D. a dribbling fuel injector

45. A diesel's fuel/water separator collects water that, if not drained, will:

A. be drawn into the system and corrode components

B. raise the boost the turbocharger can produce

C. plug the diesel oxidation catalyst with soot

D. increase the cetane number of the fuel

46. A diesel's exhaust shows blue smoke that worsens under load with dropping oil level. The MOST likely cause is:

A. coolant leaking into a cylinder through the gasket

B. oil burning past worn rings, guides, or turbo seals

C. raw fuel from a dribbling injector in a cylinder

D. normal cold-start behavior before the engine warms

47. A diesel's turbocharger wastegate is stuck open on a fixed-geometry unit. The MOST likely symptom is:

A. dangerously high boost and possible engine damage

B. low boost and a loss of engine power

C. coolant contamination of the engine oil supply

D. a no-crank condition at the starter motor

48. A diesel's coolant must include cavitation-protection additives in a wet-liner engine to prevent:

A. external rust on the exhaust manifold surface

B. overadvanced fuel injection timing under load

C. erosion and pitting of the cylinder liner walls

D. a stuck variable-geometry turbocharger actuator

49. A diesel's injector return (leak-off) test compares each injector's:

A. return fuel volume to find a leaking unit

B. compression pressure during cranking

C. boost contribution at each engine speed

D. glow plug resistance during the warm-up

50. A diesel's intake manifold pressure sensor reads higher than the actual boost. The ECM may respond by:

A. raising the alternator charging output voltage

B. commanding a no-crank condition at the starter

C. increasing the diesel exhaust fluid dosing rate

D. reducing fueling, thinking boost is already high

51. A diesel's piston shows a melted edge on the crown near one injector spray hole. A likely cause is:

A. an injector spraying poorly and overheating that area

B. coolant leaking past the head gasket into the cylinder

C. a thermostat that is stuck in the open position

D. air drawn into the fuel on the suction side of the pump

52. A diesel's DPF is replaced. Failing to reset the soot/ash values in the ECM will MOST likely cause:

A. coolant contamination of the engine oil supply

B. incorrect regeneration timing based on old data

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

53. A diesel's high-pressure pump cannot build rail pressure, supply and filters are good, and no metal is found. A likely cause is a:

A. clogged engine intake air filter element

B. thermostat stuck in the wide-open position

C. faulty pump metering or pressure control valve

D. glow plug control module that has failed open

54. A diesel's exhaust aftertreatment order from the engine is DOC, then DPF, then SCR. The DPF in this layout is responsible for:

A. converting NOx into nitrogen and water vapor

B. oxidizing carbon monoxide and hydrocarbons

C. trapping soot particles from the exhaust stream

D. metering diesel exhaust fluid into the exhaust

55. A diesel's coolant loss continues with clean oil and no external leak. A likely internal path is the:

A. crankcase ventilation oil separator element

B. cabin HVAC blower motor and resistor pack

C. diesel exhaust fluid dosing injector circuit

D. EGR cooler leaking coolant into the exhaust

56. A diesel's valve stem seals are worn, letting oil into the intake ports. The MOST likely symptom is:

A. oil consumption and blue smoke, worst at start-up

B. coolant loss into the combustion chamber

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

57. A diesel's variable-geometry turbo closes its vanes during deceleration to provide:

A. faster charging of the batteries at idle

B. priming of the low-pressure fuel circuit

C. an exhaust-braking effect to slow the vehicle

D. cooling of the compressed intake charge air

58. A diesel's compression gauge used for testing must be:

A. the same low-range gauge used on gasoline engines

B. connected to the fuel rail rather than the cylinder

C. installed only after the engine is fully warmed

D. rated for the high pressures a diesel produces

59. A diesel's oil pressure light comes on at idle but goes out at speed. Before condemning the pump, FIRST check the:

A. engine oil level, condition, and viscosity

B. cylinder compression on each cylinder

C. camshaft lobe lift against specification

D. charge-air cooler for an internal leak

60. A diesel's fuel cetane number is BEST described as a measure of how readily the fuel:

A. releases heat energy per gallon burned

B. autoignites, which shortens the ignition delay

C. resists ignition the way octane does

D. carries sulfur to lubricate the pump

PRACTICE EXAM 17 — ANSWER KEY (Questions 1–60)

1. A — A sharp metallic knock that grows under load with low oil pressure points to worn crankshaft main or rod bearings, since increased clearance lets the journals pound and bleed off pressure. Glow plug, separator, and thermostat faults do not knock under load. The combination of noise and low pressure points to the bearings.

2. C — The common rail acts as an accumulator that stores high-pressure fuel ready to feed each injection event on demand. It does not cool, filter, or recirculate. Holding a steady pressure reserve is what allows precise, repeatable injection.

3. D — After cleaning a sticking VGT, the technician must verify the vanes move freely through their full range so boost no longer surges. Raising rail pressure, flushing coolant, or replacing injectors would not confirm vane freedom. Free movement is what restores stable boost control.

4. A — An over-full oil level with a fuel smell indicates fuel dilution from a leaking or dribbling injector washing into the sump. Coolant intrusion makes oil milky, and soot only darkens it. Finding the leaking injector stops the dilution before bearing damage.

5. C — EGR lowers NOx because recirculated exhaust is inert and reduces the peak combustion temperature where NOx forms. It does not add oxygen, raise temperature, or carry ammonia. Cooling the combustion is the mechanism of NOx control.

6. C — An injector that pops open well below its rated pressure injects too early, disturbing combustion timing and causing knock or rough running. It still injects fuel and does not change rail pressure or introduce coolant. Restoring the correct opening pressure fixes the timing.

7. D — A diesel oxidation catalyst needs exhaust temperature high enough to light off before it can oxidize CO and hydrocarbons. A full DEF tank, EGR flow, or a cold engine do not enable it. Adequate exhaust temperature is the key requirement.

8. B — A head warped beyond the limit must be resurfaced within specification or replaced to restore a flat sealing surface. Stacking gaskets, over-torquing bolts, or using RTV would not seal a warped head. Machining or replacement is the correct repair.

9. A — A leaking suction line ahead of the lift pump draws air into the fuel, causing hard starting and rough running. It does not introduce coolant, raise fuel pressure, or prevent cranking. Sealing the leak removes the air and restores normal running.

10. D — Rapid overheating just after start with a cold upper hose shows coolant is not reaching the radiator, the classic sign of a thermostat stuck closed. A clogged radiator, weak fan, or leaking pump would not keep the hose cold. Replacing the thermostat restores circulation.

11. B — The oil control ring scrapes excess oil from the cylinder wall and returns it to the sump, limiting oil consumption. The compression rings seal combustion pressure, while heat transfer and pin location are other functions. Oil control is the ring's defining job.

12. D — A DEF dosing line clogged with crystals cannot deliver fluid, so NOx conversion drops and an SCR fault sets. It does not prevent cranking, raise fuel pressure, or contaminate oil. Clearing the line restores dosing and NOx control.

13. A — When a high-pressure pump sheds metal into the fuel system, the rail, lines, and injectors must be cleaned or replaced along with the pump, since debris spreads everywhere. Boost targets, coolant, and glow plug programming are unrelated. Thorough cleanup prevents a repeat failure.

14. B — A low cylinder that does not improve with added oil has a leaking or burned valve, because oil would have sealed worn rings if rings were the cause. Injector and air filter faults do not fit the dry-versus-wet result. The valve must be repaired.

15. C — Intake air temperature affects air density, so the ECM uses the sensor to adjust the fueling it commands. It is not used to set DEF dosing, charging voltage, or back-pressure. Accurate air temperature keeps fueling correct.

16. B — A partially blocked turbo oil supply line starves the bearings, causing wear from inadequate lubrication. It does not introduce coolant, raise fuel pressure, or prevent cranking. Restoring oil flow protects the turbo bearings.

17. D — A glow plug module that never energizes the plugs leaves the chambers cold, producing hard cold starting and white smoke until the engine warms. The plugs do not overheat without power, and fuel pressure, coolant, and oil are unaffected. Restoring the control circuit fixes cold starting.

18. D — The primer and vent screw are used after a filter change to prime the system and bleed out trapped air so the engine starts and runs smoothly. They do not raise cetane, cool fuel, or program codes. Proper priming prevents long cranking and rough running.

19. B — Bearing crush is the slight extra height that, when the cap is torqued, grips the bearing tightly in its bore and promotes heat transfer. It is not for oil drain-back, rod float, or pin expansion. Proper crush keeps the bearing seated and cool.

20. B — An internal EGR cooler leak lets coolant enter the exhaust and intake path, causing white smoke and coolant loss. It does not raise boost, prevent cranking, or overcharge batteries. Replacing the cooler stops the coolant intrusion.

21. C — Exhaust temperature sensors let the ECM manage the regeneration burn and protect the aftertreatment from overheating. They do not set charging voltage, rail pressure, or DEF metering. Temperature feedback keeps regeneration safe and effective.

22. B — A journal out-of-round beyond the limit must be reground and fitted with undersize bearings to restore a true surface and correct clearance. Thicker bearings, more oil pressure, or shims would not fix the out-of-round. Regrinding and undersize bearings is the correct repair.

23. D — Normal boost with low power and high exhaust temperature points to an exhaust restriction such as a plugged DPF, which should be checked next. Battery, HVAC, and DEF level would not produce this combination. Measuring back-pressure confirms the restriction.

24. D — Correct wet-liner protrusion (stand-out) provides the clamping needed for head-gasket sealing and prevents coolant and combustion leaks. It does not set timing, spring height, or injector return. Proper stand-out is critical to sealing the liner.

25. A — Abnormally hot return fuel with power loss on long hot pulls points to a failed or bypassed fuel return cooler letting fuel temperature climb. A thermostat, glow plug module, or HVAC blower would not raise fuel temperature. Restoring the cooler stabilizes performance when hot.

26. C — The injector calibration code lets the ECM correct for that injector's exact flow characteristics, balancing fueling across cylinders. It does not count events, read return temperature, or disable cylinders. Entering the code keeps the engine smooth after replacement.

27. C — A turbo with excessive shaft play, whine, and slow boost has worn bearings and must be replaced. Raising boost targets, cleaning the intake, or reprogramming injectors would not fix the mechanical wear. A new turbo restores boost.

28. A — If oil pressure drops too low, the piston cooling jets may stop spraying, risking piston overheating. They do not raise boost, introduce coolant, or dose DEF. Adequate oil pressure is essential for piston cooling.

29. A — Water in diesel is harmful mainly because it corrodes and damages high-pressure fuel components. It does not raise cetane, plug the DPF, or increase sulfur. Draining the water protects the injection system.

30. B — With the EGR valve stuck closed and combustion temperature confirmed high, the repair is to free or replace the valve so it opens and recirculates exhaust again. Raising rail pressure, forcing a regen, or reprogramming injectors would not restore EGR flow. Restoring the valve lowers NOx.

31. C — An oil pressure relief valve stuck open dumps oil too early, so the system cannot build full pressure and oil pressure runs low. A stuck-closed valve would cause high pressure instead. Restoring the valve returns normal pressure.

32. A — Low, even compression on all cylinders with heavy blow-by indicates general ring and cylinder wear, calling for major service. A single injector, a coolant flush, or DEF would not address uniform wear. Overhaul restores compression.

33. D — A belt that has thrown chunks with a charging warning calls for inspecting the pulleys and tensioner for the cause before installing a new belt. Raising rail pressure, forcing a regen, or reprogramming injectors ignores the source. Finding the cause protects the new belt.

34. C — Air pockets causing erratic temperatures and hot spots are corrected by properly bleeding the trapped air from the cooling system. A higher-rated cap, a hotter thermostat, or stop-leak would not remove the air. Bleeding restores even, accurate cooling.

35. C — The high-pressure pump's fuel pressure regulator (metering valve) controls rail pressure by metering fuel into the pump. It does not set glow plug time, open the wastegate, or dose DEF. Metering inlet fuel is how rail pressure is regulated.

36. A — Running slightly cool with poor heat and reduced economy indicates a thermostat stuck open, letting coolant circulate before the engine warms. A gasket leak, loose pump, or clogged radiator would tend to overheat. Replacing the thermostat restores proper temperature.

37. D — A gear-driven camshaft mistimed after service shifts valve timing, causing poor running, low power, and hard starting. It does not introduce coolant, overcharge batteries, or prevent cranking. Correct cam timing restores performance.

38. C — One-time-use high-pressure fuel lines should be replaced with new lines to ensure a reliable seal at extreme pressure. Reusing, heating, or swapping them risks leaks. New lines guarantee a proper seal.

39. B — A downstream NOx sensor reading nearly the same as the upstream sensor shows the SCR catalyst is not reducing NOx as it should. Soot load, glow plugs, and boost would not produce matched readings. The matched values reveal poor catalyst conversion.

40. D — Recutting a valve seat too deep sinks the valve into the head, lowering the installed valve-spring height and its pressure. It does not change bore taper, rod side clearance, or lobe lift. Restoring installed height keeps the spring closing the valve firmly.

41. D — Idling a hard-worked turbo briefly before shutdown lets the bearings cool so residual heat does not coke the oil. It does not raise cetane, charge batteries, or run a regeneration. The cool-down protects the turbo bearings.

42. A — A grid heater that stays on too long after start usually has a relay stuck closed or a faulty control module keeping it powered. A thermostat, fuel pump, or HVAC blower would not energize the heater. Repairing the relay or module restores correct operation.

43. B — An internal leak in an oil-to-coolant cooler lets the two fluids mix, cross-contaminating oil and coolant. It does not prevent cranking, raise fuel pressure, or plug the DPF. Detecting the mix points directly to the cooler.

44. B — A low cylinder that improves with added oil has worn or broken piston rings, since the oil temporarily seals them. A valve leak, head crack, or injector dribble would not improve with oil. The wet-test result points to the rings.

45. A — Undrained water in the separator will be drawn into the system and corrode high-pressure components. It does not raise boost, plug the DOC, or increase cetane. Draining the water protects the injection system.

46. B — Blue smoke worsening under load with a dropping oil level indicates oil burning past worn rings, guides, or turbo seals. Coolant or fuel intrusion and cold-start smoke produce different symptoms. Locating the oil path guides the repair.

47. B — A wastegate stuck open on a fixed-geometry turbo bleeds off exhaust before it can spin the turbine, causing low boost and lost power. A stuck-closed wastegate would overboost instead. Restoring wastegate function returns boost.

48. C — Wet-liner coolant needs cavitation-protection additives to prevent erosion and pitting of the liner walls from collapsing vapor bubbles. Manifold rust, injection timing, and the turbo actuator are unrelated. Maintaining additives protects the liners.

49. A — A leak-off test compares each injector's return fuel volume to find one returning excessively, which is leaking internally. It does not compare compression, boost, or glow plug resistance. The return comparison identifies the bad injector.

50. D — A boost (MAP) sensor reading higher than actual makes the ECM think boost is already high, so it may reduce fueling and cut power. It does not change charging, cranking, or DEF dosing. Replacing the sensor restores correct fueling.

51. A — A melted crown edge near one injector spray hole indicates that injector is spraying poorly and overheating that local area. Coolant intrusion, a stuck thermostat, or suction-side air would not melt the crown there. Servicing the injector prevents repeat damage.

52. B — Failing to reset the DPF soot and ash values leaves the ECM working from old data, so regeneration timing is incorrect. It does not introduce coolant, raise fuel pressure, or prevent cranking. Resetting the values matches the ECM to the new filter.

53. C — Good supply, clean filters, and no metal but no rail pressure point to a faulty pump metering or pressure control valve that cannot regulate pressure. Air filter, thermostat, and glow plug faults would not affect rail pressure. Replacing the valve restores pressure.

54. C — In the DOC-DPF-SCR layout, the particulate filter traps soot particles from the exhaust stream. The DOC oxidizes CO and HC, and the SCR reduces NOx. Soot trapping is the DPF's role.

55. D — Continued coolant loss with clean oil and no external leak points to an internal coolant-to-exhaust path such as a leaking EGR cooler. The CCV separator, HVAC blower, and DEF circuit do not consume coolant. Inspecting the EGR cooler locates the loss.

56. A — Worn valve stem seals let oil into the intake ports, causing oil consumption and blue smoke, worst at start-up when oil has pooled. They do not lose coolant, raise fuel pressure, or prevent cranking. New seals stop the oil consumption.

57. C — A VGT closing its vanes during deceleration raises exhaust back-pressure to provide an exhaust-braking effect that slows the vehicle. It does not charge batteries, prime fuel, or cool the charge air. The vane action creates the braking.

58. D — A diesel compression test requires a gauge rated for the very high pressures diesels produce, read through the injector or glow plug port. A gasoline gauge, a rail connection, or a hot-only install would be wrong. The correct high-range gauge gives valid readings.

59. A — Before condemning the oil pump for low idle pressure, first verify the oil level, condition, and viscosity, since these cheaply explain low pressure. Compression, lobe lift, and the charge-air cooler are unrelated to oil pressure. Checking the basics first avoids an unneeded pump job.

60. B — Cetane number measures how readily diesel fuel autoignites, which shortens the ignition delay. It is not energy content, octane-like resistance, or sulfur level. Higher cetane improves cold starting and smooths combustion.