PRACTICE EXAM 13: A9 LIGHT VEHICLE DIESEL ENGINES SIMULATION (60 QUESTIONS)

1. A diesel engine has been overheated severely and now shows coolant in the oil, white smoke, and bubbles in the radiator. The MOST likely cause is a:

A. blown head gasket or warped cylinder head

B. fuel injector dribbling fuel into a cylinder

C. clogged engine air filter restricting airflow

D. glow plug that has failed open on one cylinder

2. A diesel's fuel filter is being replaced. To prevent contamination of the high-pressure system, the technician should:

A. blow the new filter clean with shop compressed air

B. fill the new filter with clean diesel before installing it

C. rinse the new filter with engine coolant first

D. soak the new filter in motor oil before installation

3. A diesel that has sat unused for months is hard to start and the fuel smells varnished. The MOST likely fuel-related cause is:

A. the cetane number rising during long storage

B. water freezing inside the high-pressure pump

C. sulfur content increasing while in the tank

D. fuel oxidation and gum formation degrading the fuel

4. A diesel's intake manifold air temperature sensor reads much higher than actual. The MOST likely effect is that the ECM may:

A. raise the alternator charging output voltage

B. adjust fueling or timing based on the wrong air temperature

C. command a no-crank condition at the starter

D. increase the diesel exhaust fluid dosing rate

5. A worn turbocharger is leaking oil into both the intake and the exhaust. The MOST likely symptom set is:

A. coolant loss with white smoke and a sweet odor

B. blue smoke, oil consumption, and oily intake piping

C. a no-crank condition with normal battery voltage

D. overcharging of the vehicle's starting batteries

6. A diesel's EGR cooler is suspected of an internal leak. A useful confirming test is to:

A. measure the boost pressure produced at idle

B. check the engine oil pressure at operating temperature

C. read the exhaust back-pressure under full load

D. pressure-test the cooling system and watch for coolant loss

7. A common-rail diesel's rail pressure sensor signal is erratic. The MOST likely effect is:

A. coolant contamination of the engine oil supply

B. unstable fueling, poor running, and possible stalling

C. overcharging of the vehicle's starting batteries

D. a permanently plugged diesel particulate filter

8. During engine assembly, the technician checks crankshaft end play and finds it excessive. This MOST likely indicates worn:

A. thrust bearing surfaces controlling end movement

B. connecting-rod bearings on the crankpins

C. camshaft lobes reducing valve lift

D. piston rings allowing combustion blow-by

9. A diesel's variable-geometry turbocharger is stuck with the vanes fully open. The MOST likely symptom is:

A. dangerously high boost at low engine speed

B. coolant contamination of the engine oil supply

C. low boost and sluggish response at low speed

D. a no-crank condition at the starter motor

10. A diesel injector tip has eroded and now sprays an uneven, ragged pattern. The MOST likely results are:

A. coolant entering the engine oil supply

B. overcharging of the starting batteries

C. rough running, smoke, and uneven cylinder power

D. a permanently plugged diesel particulate filter

11. A diesel's oil pressure relief valve is stuck open. The MOST likely result is:

A. low oil pressure, since the valve dumps oil too early

B. high oil pressure that never relieves at any rpm

C. coolant contamination of the engine oil supply

D. a stuck-open exhaust gas recirculation valve

12. A diesel cranks slowly and barely starts in cold weather, and the batteries and connections test good. The technician should next check the:

A. starter motor draw and the engine's mechanical resistance

B. diesel exhaust fluid tank level and quality

C. variable-geometry turbocharger vane position

D. cabin HVAC blower motor and its resistor

13. A diesel's coolant temperature sensor reads colder than actual. The MOST likely effect is that the ECM may:

A. raise the maximum boost the turbocharger builds

B. increase the diesel exhaust fluid dosing rate

C. command a no-crank condition at the starter

D. keep the engine in a rich, warm-up fueling mode too long

14. A diesel head gasket has failed between two adjacent cylinders. A likely symptom is:

A. coolant loss with no change in engine running

B. low compression in both cylinders and a misfire

C. overcharging of the vehicle's starting batteries

D. a no-crank condition at the starter motor

15. A diesel uses a crankcase ventilation (CCV) system. A clogged CCV filter or system can cause:

A. coolant contamination of the engine oil supply

B. raised crankcase pressure and oil leaks or seal damage

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

16. A diesel's compression test reading is well below specification on all cylinders, and blow-by is heavy. The engine MOST likely needs:

A. major service for worn rings and cylinders

B. a single injector replaced on one cylinder

C. the cooling system flushed and refilled

D. the diesel exhaust fluid tank refilled

17. A diesel's glow plug system uses a relay or module. If the relay sticks closed, the glow plugs may:

A. never receive power and fail to heat at all

B. heat only after the engine has fully warmed up

C. receive power only during cranking and no longer

D. stay powered too long and burn out from overheating

18. A diesel's fuel system is primed after service using a hand primer pump. The purpose is to:

A. raise the cetane number of the fuel for starting

B. cool the fuel before it reaches the injectors

C. fill the system and push out trapped air before starting

D. program the injector calibration codes into the ECM

19. A diesel's exhaust has a strong smell of unburned fuel and the engine runs rough at idle. A likely cause is:

A. a thermostat stuck in the open position

B. a clogged radiator restricting coolant flow

C. one or more injectors misfiring or leaking

D. a serpentine belt slipping on the pulleys

20. A diesel's intake system has an oil separator in the crankcase breather circuit. Its purpose is to:

A. trap oil mist so it is not drawn into the intake

B. cool the fuel returning to the tank from the rail

C. meter diesel exhaust fluid into the exhaust

D. raise the boost the turbocharger can produce

21. A diesel's camshaft is gear-driven from the crankshaft. Worn timing gears will MOST likely cause:

A. incorrect valve and injection timing and poor running

B. coolant contamination of the engine oil supply

C. excessively high common-rail fuel pressure

D. a stuck-open exhaust gas recirculation valve

22. A diesel particulate filter forces a regeneration but the soot level will not drop and exhaust temperatures stay low. A likely cause is:

A. an overfilled diesel exhaust fluid tank

B. a fully charged set of starting batteries

C. a clogged cabin air filter restricting airflow

D. a failing fuel injector or low exhaust temperature for regen

23. A diesel's lift pump pressure is normal, the filters are clean, but the high-pressure pump cannot build rail pressure and produces metal in the fuel. The MOST likely cause is a:

A. thermostat stuck in the open position

B. clogged radiator restricting coolant flow

C. glow plug control module that has failed open

D. mechanically failed high-pressure pump

24. A diesel's valve seats are recut during a head rebuild. After recutting, the valves will sit:

A. higher out of the head than before the cut

B. unchanged in position relative to the head

C. deeper into the head, lowering installed spring height

D. at a steeper face angle than originally machined

25. A diesel's turbocharger makes a high-pitched whistle that changes with boost, and a boost leak is suspected. The technician should:

A. raise the commanded boost target inside the ECM

B. pressurize the intake tract and listen for the leak

C. command a forced particulate filter regeneration

D. reprogram the injector calibration codes in the ECM

26. A diesel's oil shows a high iron content on analysis. This MOST likely indicates wear of:

A. aluminum pistons and the cylinder head

B. iron components such as cylinders, rings, or the crankshaft

C. copper bearings and bushings only

D. the diesel exhaust fluid dosing components

27. A diesel's fuel return system includes a check valve that holds residual pressure after shutdown. If this valve leaks, the result is MOST likely:

A. coolant contamination of the engine oil supply

B. excessively high boost at low engine speed

C. hard hot restarts as the prime drains away

D. a no-crank condition at the starter motor

28. A diesel's coolant is the wrong type and has caused a gel or sludge in the system. The correct repair is to:

A. flush the system thoroughly and refill with the specified coolant

B. add a stronger thermostat to raise the temperature

C. raise the radiator cap pressure rating to compensate

D. install a larger charge-air cooler to lower temperatures

29. A diesel's intake grid heater draws very high current. The technician must ensure the:

A. diesel exhaust fluid tank is full before testing

B. variable-geometry turbo vanes are fully closed

C. cables, relay, and connections can handle the load

D. cabin HVAC blower is set to its highest speed

30. A diesel's injector return volume is measured during diagnosis. An injector returning far MORE fuel than the others is MOST likely:

A. leaking internally and bleeding off rail pressure

B. operating correctly within normal tolerance

C. completely blocked and returning no fuel at all

D. drawing excessive electrical current from the ECM

31. A diesel's piston ring grooves are worn wider than spec, increasing ring side clearance. The MOST likely result is:

A. coolant contamination of the engine oil supply

B. excessively high common-rail fuel pressure

C. a no-crank condition at the starter motor

D. increased blow-by and oil consumption

32. A diesel uses a closed-loop SCR strategy. The downstream NOx sensor allows the ECM to:

A. measure the boost pressure produced by the turbo

B. control the high pressure delivered to the fuel rail

C. set the glow plug on-time at cold start

D. trim DEF dosing based on actual NOx conversion

33. A diesel's oil cooler is plugged on the oil side. The MOST likely result is:

A. coolant loss with white smoke from the exhaust

B. high engine oil temperature and possible oil breakdown

C. excessively high common-rail fuel pressure at idle

D. a no-crank condition at the starter motor circuit

34. A diesel's compression is being tested. The injectors or glow plugs are removed and the engine is cranked to read each cylinder. The compression gauge must be:

A. rated for the high pressures a diesel produces

B. the same low-range gauge used for gasoline engines

C. connected to the fuel rail rather than the cylinder

D. installed only after the engine reaches full temperature

35. A diesel's variable-geometry turbo actuator is electric and reports a position error. Before replacing the turbo, the technician should:

A. raise the commanded boost target inside the ECM

B. command a forced particulate filter regeneration

C. test the actuator, its wiring, and the vane movement

D. reprogram the injector calibration codes in the ECM

36. A diesel's fuel tank vent becomes blocked. The MOST likely symptom is:

A. coolant contamination of the engine oil supply

B. excessively high boost at low engine speed

C. fuel starvation and stalling as a vacuum forms in the tank

D. a no-crank condition at the starter motor circuit

37. A diesel's connecting-rod bearing has spun in its bore. A common root cause is:

A. loss of oil pressure or inadequate lubrication

B. coolant leaking past the head gasket

C. a clogged engine air filter element

D. an overfilled diesel exhaust fluid tank

38. A diesel's water pump is leaking from its weep hole. This indicates that the:

A. thermostat is stuck in the open position

B. radiator is clogged with external road debris

C. water pump shaft seal has failed and needs replacement

D. head gasket is leaking combustion gas into the coolant

39. A diesel's exhaust gas recirculation rate is calculated by the ECM using inputs from the:

A. rail-pressure sensor and the fuel temperature sensor

B. glow plug controller and the battery voltage sensor

C. airflow and manifold pressure sensors among others

D. diesel exhaust fluid level and quality sensors

40. A diesel's injectors are described as piezo type. A practical service note is that piezo injectors:

A. require careful handling and correct calibration coding

B. operate without any electrical signal from the ECM

C. never need replacement over the life of the engine

D. are interchangeable between cylinders without coding

41. A diesel that meets emissions with EGR and a DPF but no SCR controls NOx mainly through:

A. ammonia stored in the oxidation catalyst

B. diesel exhaust fluid injected into the exhaust

C. soot trapping in the particulate filter

D. exhaust gas recirculation lowering combustion temperature

42. A diesel's serpentine belt is contaminated with oil from a leaking front seal. Before installing a new belt, the technician should:

A. raise the commanded rail pressure inside the ECM

B. repair the oil leak so the new belt is not ruined

C. command a forced particulate filter regeneration

D. reprogram the injector calibration codes in the ECM

43. A diesel's cooling system uses an expansion (overflow) tank. Its purpose is to:

A. raise the cetane number of the diesel fuel

B. meter diesel exhaust fluid into the exhaust

C. cool the fuel returning to the tank from the rail

D. allow coolant to expand and contract with temperature

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

A. set the glow plug on-time at cold start

B. control the diesel exhaust fluid dosing rate

C. meter fuel into the pump to control rail pressure

D. open the wastegate to limit turbocharger boost

45. A diesel's exhaust manifold has a crack that leaks under load. The MOST likely symptoms are:

A. coolant loss with white smoke from the exhaust

B. overcharging of the vehicle's starting batteries

C. a no-crank condition at the starter motor circuit

D. a ticking exhaust leak noise and possible low boost

46. A diesel's turbocharger should be allowed a brief idle before shutdown after hard work to:

A. let the bearings cool so the oil does not coke

B. raise the cetane number of the remaining fuel

C. recharge the batteries before the engine stops

D. complete a diesel particulate filter regeneration

47. A diesel's valve stem-to-guide clearance is excessive on several intake valves. The MOST likely symptom is:

A. oil consumption and blue smoke past the guides

B. coolant loss into the combustion chamber

C. excessively high common-rail fuel pressure

D. a no-crank condition at the starter motor

48. A diesel's fuel/water separator bowl is full of water that was not drained. The MOST likely consequence is:

A. overcharging of the vehicle's starting batteries

B. corrosion and damage to high-pressure fuel components

C. a permanently plugged diesel oxidation catalyst

D. a stuck-open exhaust gas recirculation valve

49. A diesel's intake charge-air cooler hose pops off under boost repeatedly. The MOST likely result each time is:

A. coolant loss and a steadily overheating engine

B. sudden loss of boost, power, and a check-engine light

C. a no-crank condition at the starter solenoid

D. overcharging of the vehicle's starting batteries

50. A diesel's NOx output rises sharply after the EGR valve sticks closed. This happens because:

A. the injectors begin dribbling raw fuel into the cylinders

B. the turbocharger produces far too little boost

C. the glow plugs stay energized far too long

D. combustion temperature rises without recirculated exhaust

51. A diesel's high-pressure fuel lines are one-time-use on many engines. After disconnecting them, the technician should:

A. clean and reuse them with new sealing washers

B. replace them with new lines to ensure a proper seal

C. heat them to relieve stress and reinstall them

D. swap them between cylinders to even out wear

52. A diesel's oil pump pickup screen is partially blocked with sludge. The MOST likely result is:

A. coolant contamination of the engine oil supply

B. excessively high common-rail fuel pressure

C. a no-crank condition at the starter motor

D. low oil pressure, especially at higher engine speeds

53. A diesel's DEF tank is accidentally filled with diesel fuel. The correct action is to:

A. run the engine to burn the contamination out of the tank

B. add water to dilute the fuel in the DEF tank

C. drain and flush the DEF system before it is damaged

D. raise the commanded rail pressure inside the ECM

54. A diesel's compression varies widely between cylinders. The cylinder with the lowest reading also fails to improve with a wet test. That cylinder MOST likely has:

A. worn or broken piston rings

B. a leaking or burned valve

C. a dribbling fuel injector

D. a clogged intake air filter

55. A diesel's turbocharger oil drain (return) line is restricted. The MOST likely result is:

A. a no-crank condition at the starter motor

B. coolant loss with white smoke from the exhaust

C. oil backing up and leaking past the turbo seals

D. excessively high common-rail fuel pressure

56. A diesel's piston cooling oil jets spray oil at the piston undersides. If oil pressure is too low, these jets may:

A. raise the boost the turbocharger can produce

B. meter diesel exhaust fluid into the exhaust

C. cause coolant to enter the engine oil supply

D. fail to cool the pistons, risking heat damage

57. A diesel's glow plugs are being tested for resistance. A plug reading near zero ohms (a dead short) will MOST likely:

A. draw excessive current and may damage the circuit

B. fail to draw any current and never heat up

C. operate correctly within its normal range

D. heat only after the engine fully warms up

58. A diesel's coolant has lost its cavitation-protection additives in a wet-liner engine, and pinholes have formed through a liner. Coolant is now entering:

A. the intake manifold air stream only

B. the diesel exhaust fluid storage tank

C. the turbocharger bearing housing

D. the cylinder and the engine oil through the liner

59. A diesel's EGR valve is carbon-fouled and sticking. Cleaning is performed, but to prevent rapid re-fouling the technician should also advise:

A. raising the commanded rail pressure inside the ECM

B. installing a larger charge-air cooler on the engine

C. longer drive cycles that let the engine reach full temperature

D. refilling the diesel exhaust fluid tank more often

60. A diesel's injectors are removed and a leak-off test is run with the engine cranking. The test compares:

A. the compression pressure of each cylinder

B. the return fuel volume from each injector

C. the boost pressure produced at each rpm

D. the resistance of each glow plug element

PRACTICE EXAM 13 – ANSWER KEY (Questions 1–60)

1. A — Coolant in the oil, white smoke, and radiator bubbles after a severe overheat are the classic signs of a blown head gasket or a warped head losing its seal. An injector, air filter, or glow plug fault would not move coolant and combustion gases across the head. Repairing the gasket and checking head flatness is required.

2. B — Filling the new fuel filter with clean diesel before installation reduces trapped air and hard cranking without introducing contaminants. Compressed air, coolant, and motor oil would all contaminate or damage the high-pressure system. Clean-fuel priming protects the precision components.

3. D — Diesel left for months oxidizes and forms gum and varnish that degrade the fuel and plug filters, making the engine hard to start. Cetane does not rise, water freezing is seasonal, and sulfur does not increase in storage. Replacing the degraded fuel restores easy starting.

4. B — An intake air temperature sensor reading too high feeds the ECM a false value, so it may adjust fueling or timing incorrectly for the actual air temperature. It does not control charging, cranking, or DEF dosing. Correcting the sensor restores proper fuel and timing calculations.

5. B — A turbo leaking oil into both the intake and exhaust burns that oil, producing blue smoke, oil consumption, and oily intake piping. Coolant loss, no-crank, and overcharging point elsewhere. Worn turbo seals must be addressed to stop the oil loss.

6. D — An internal EGR cooler leak lets coolant escape into the exhaust, so pressure-testing the cooling system and watching for coolant loss helps confirm it. Boost, oil pressure, and back-pressure readings do not reveal a coolant-side leak. A pressure test isolates the leaking cooler.

7. B — An erratic rail-pressure sensor signal feeds the ECM unstable feedback, causing unstable fueling, poor running, and possible stalling. It does not introduce coolant, overcharge batteries, or plug the DPF. Replacing the sensor restores stable pressure control.

8. A — Excessive crankshaft end play points to worn thrust bearing surfaces, since the thrust bearing is what limits fore-and-aft crank movement. Rod bearings, cam lobes, and rings do not control end play. Replacing the thrust bearing restores correct end clearance.

9. C — VGT vanes stuck fully open cannot speed exhaust onto the turbine at low rpm, so boost is low and response is sluggish at low speed. Stuck-open vanes do not cause overboost, coolant loss, or no-crank. Freeing or replacing the turbo restores low-speed boost.

10. C — An eroded injector tip sprays a ragged, uneven pattern that burns poorly, causing rough running, smoke, and uneven cylinder power. It does not introduce coolant, overcharge batteries, or plug the DPF directly. Replacing the injector restores clean spray and smooth running.

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

12. A — With good batteries and connections but slow cranking, the next checks are starter motor current draw and the engine's mechanical resistance, since one of these is limiting cranking speed. DEF, VGT, and HVAC are unrelated to cranking. Measuring starter draw narrows the cause.

13. D — A coolant temperature sensor reading colder than actual makes the ECM think the engine is still cold, so it holds a rich warm-up fueling mode too long, hurting economy and emissions. It does not raise boost, increase DEF dosing, or stop cranking. Replacing the sensor corrects the fueling.

14. B — A head gasket failed between two adjacent cylinders lets compression cross between them, producing low compression in both and a misfire. Coolant loss with no running change, overcharging, and no-crank do not fit. A compression test confirms the breach.

15. B — A clogged crankcase ventilation system traps blow-by, raising crankcase pressure that forces oil past seals and causes leaks. It does not introduce coolant, raise fuel pressure, or prevent cranking. Servicing the CCV relieves the pressure and stops the leaks.

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

17. D — A glow plug relay stuck closed keeps the plugs energized too long, overheating and burning them out. A stuck-open or intermittent relay would instead cut power. Replacing the relay protects the plugs from overheating.

18. C — Hand-priming after fuel service fills the system and pushes out trapped air so the engine will start and run smoothly. It does not raise cetane, cool fuel, or program codes. Proper priming prevents long cranking and rough running.

19. C — A strong unburned-fuel odor with rough idle points to one or more injectors misfiring or leaking, putting raw fuel into the exhaust. A thermostat, radiator, or belt fault would not smell of raw fuel. Testing the injectors locates the fault.

20. A — The oil separator in the breather circuit traps oil mist so it is not drawn into the intake, reducing intake fouling and oil consumption. It does not cool fuel, dose DEF, or raise boost. A working separator keeps oil out of the intake charge.

21. A — Worn timing gears between crankshaft and camshaft shift valve and injection timing, causing poor running and lost power. They do not introduce coolant, raise fuel pressure, or stick the EGR valve. Replacing the gears restores correct timing.

22. D — When a forced regen will not lower soot and exhaust stays cool, a failing injector or insufficient exhaust temperature is preventing the burn. DEF level, battery charge, and the cabin filter are unrelated to regen heat. Restoring proper exhaust temperature allows regeneration to complete.

23. D — Normal supply and clean filters but no rail pressure plus metal in the fuel indicate a mechanically failed high-pressure pump shedding debris. Thermostat, radiator, and glow plug faults do not affect rail pressure. The pump must be replaced and the system cleaned.

24. C — Recutting valve seats lets the valves sink deeper into the head, which lowers the installed spring height and can reduce spring pressure. The valves do not rise, stay put, or change face angle from seat recutting. Shims or new parts may be needed to restore installed height.

25. B — A boost-related whistle is found by pressurizing the intake tract and listening for the escaping air at the leak. Raising boost targets, forcing a regen, or reprogramming injectors would not locate a leak. Pressurizing the system pinpoints it for repair.

26. B — High iron in an oil analysis indicates wear of iron components such as cylinders, rings, or the crankshaft. Aluminum, copper, and DEF components would show different wear metals. The iron reading directs inspection to the ferrous parts.

27. C — A leaking return check valve lets the prime drain back after shutdown, so the engine is hard to restart while hot until pressure rebuilds. It does not introduce coolant, raise boost, or prevent cranking. Restoring the check valve fixes the hot-restart problem.

28. A — The wrong coolant that has gelled or sludged the system must be flushed out thoroughly and refilled with the specified coolant. A different thermostat, higher cap pressure, or a larger cooler would not remove the contamination. A complete flush restores proper cooling.

29. C — A grid intake heater draws very high current, so the technician must confirm the cables, relay, and connections can carry that load without overheating or voltage drop. DEF level, turbo vanes, and the HVAC blower are unrelated. Adequate circuit capacity ensures safe heater operation.

30. A — An injector returning far more fuel than the others is leaking internally and bleeding off rail pressure. Normal tolerance, complete blockage, or excessive current draw would show different results. The high return volume identifies the failing injector.

31. D — Worn ring grooves increase ring side clearance, letting more combustion gas and oil past, which raises blow-by and oil consumption. The wear does not introduce coolant, raise fuel pressure, or prevent cranking. New pistons or rings restore proper sealing.

32. D — In closed-loop SCR the downstream NOx sensor lets the ECM trim DEF dosing based on actual NOx conversion, fine-tuning the reaction. It does not measure boost, control rail pressure, or set glow plug time. The feedback keeps NOx conversion accurate.

33. B — An oil cooler plugged on the oil side cannot remove heat, so engine oil temperature climbs and the oil can break down. It does not cause coolant loss with white smoke, raise fuel pressure, or prevent cranking. Clearing or replacing the cooler restores oil cooling.

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

35. C — A VGT actuator position error calls for testing the actuator, its wiring, and actual vane movement before condemning the whole turbo. Raising boost targets, forcing a regen, or reprogramming injectors would not address the actuator. Verifying the actuator avoids an unnecessary turbo replacement.

36. C — A blocked fuel tank vent lets a vacuum form as fuel is drawn out, starving the engine and causing stalling. It does not introduce coolant, raise boost, or prevent cranking. Clearing the vent restores normal fuel flow.

37. A — A spun connecting-rod bearing usually results from loss of oil pressure or inadequate lubrication overheating and seizing the bearing. Coolant leaks, a dirty air filter, and DEF level are not the cause. Restoring proper lubrication prevents a repeat failure.

38. C — Coolant leaking from the water pump's weep hole means the shaft seal has failed and the pump needs replacement. A thermostat, radiator, or head-gasket fault would not leak from the weep hole. Replacing the pump stops the leak.

39. C — The ECM calculates the EGR rate using airflow and manifold pressure sensors, among others, comparing expected and actual air. Rail pressure, glow plug, and DEF sensors are not used for this. Accurate air data sets the correct EGR rate.

40. A — Piezo injectors are sensitive and require careful handling and correct calibration coding when serviced. They still need an electrical signal, can require replacement, and are not interchangeable without coding. Proper handling and coding ensure correct operation.

41. D — A diesel using EGR and a DPF but no SCR controls NOx mainly by recirculating exhaust to lower combustion temperature. There is no DEF, ammonia storage, or NOx trapping in the soot filter in this layout. EGR is the primary NOx strategy here.

42. B — An oil-soaked belt means the leaking front seal must be repaired first, or the new belt will be ruined by the same oil. Raising rail pressure, forcing a regen, or reprogramming injectors ignores the leak. Fixing the leak protects the new belt.

43. D — The expansion (overflow) tank gives coolant room to expand and contract with temperature, maintaining a full, air-free system. It does not raise cetane, dose DEF, or cool fuel. The tank keeps the cooling system properly filled.

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

45. D — A cracked exhaust manifold leaking under load produces a ticking exhaust noise and can reduce boost by bleeding off exhaust energy. It does not lose coolant, overcharge batteries, or prevent cranking. Repairing the manifold restores a sealed exhaust and boost.

46. A — 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.

47. A — Excessive valve stem-to-guide clearance lets oil be drawn down the guides into the cylinder, causing oil consumption and blue smoke. It does not lose coolant, raise fuel pressure, or prevent cranking. New guides or seals stop the oil consumption.

48. B — Undrained water in the separator bowl can reach and corrode the high-pressure fuel components, damaging them. It does not overcharge batteries, plug the DOC, or stick the EGR valve. Draining the water protects the injection system.

49. B — A charge-air cooler hose that pops off under boost dumps the pressurized charge, causing a sudden loss of boost and power and setting a check-engine light. It does not lose coolant, prevent cranking, or overcharge batteries. Securing the hose restores boost.

50. D — With the EGR valve stuck closed, no cooled exhaust dilutes the charge, so combustion temperature rises and NOx output climbs sharply. Injector dribble, low boost, and glow plug timing do not raise NOx this way. Restoring EGR flow lowers combustion temperature and NOx.

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

52. D — A partially blocked oil pump pickup screen restricts oil flow, producing low oil pressure that worsens at higher engine speeds when demand is greatest. It does not introduce coolant, raise fuel pressure, or prevent cranking. Cleaning the pickup restores oil flow.

53. C — DEF contaminated with diesel fuel must have the DEF system drained and flushed before the fuel damages the dosing components and catalyst. Running the engine, adding water, or raising rail pressure would worsen or ignore the problem. Flushing protects the SCR system.

54. B — A low cylinder that does not improve on a wet test has a leaking or burned valve, since oil on the rings would have helped if rings were the cause. Ring wear, injector dribble, and a dirty filter do not fit the dry-versus-wet result. The valve must be repaired.

55. C — A restricted turbo oil drain line lets oil back up in the bearing housing and leak past the seals into the intake or exhaust. It does not prevent cranking, lose coolant, or raise fuel pressure. Clearing the drain restores proper oil return.

56. D — If oil pressure is too low, the piston cooling jets cannot spray enough oil, so the pistons may overheat and risk heat damage. The jets do not raise boost, dose DEF, or move coolant. Adequate oil pressure is essential for piston cooling.

57. A — A glow plug reading near zero ohms is shorted and will draw excessive current that can damage the circuit or controller. An open plug draws no current, and a good plug reads a low specified value. The shorted plug must be replaced to protect the system.

58. D — Cavitation pinholes through a wet liner let coolant enter the cylinder and the engine oil through the liner wall. The coolant does not go to the intake, DEF tank, or turbo housing through the liner. Replacing the liner and restoring additives stops the leak.

59. C — After cleaning a carbon-fouled EGR valve, advising longer drive cycles that let the engine reach full temperature helps burn off deposits and slows re-fouling. Raising rail pressure, fitting a larger cooler, or adding DEF would not prevent soot buildup. Proper drive cycles keep the valve cleaner.

60. B — A leak-off test run while cranking compares the return fuel volume from each injector, flagging any that returns excessively. It does not compare compression, boost, or glow plug resistance. The return-volume comparison identifies a leaking injector.