



AUTO Maintenance and Light Repair



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Overview

This guide is intended to help technicians study for LEVEL 1-3 Auto Maintenance and Light Repair Test

Test Specifications and Task List Auto Maintenance and Light Repair (Test G1)

Content Area	Questions in Test	Percentage of Test
A. Engine Systems	9	16%
B. Automatic Transmission/Transaxle	4	7%
C. Manual Drive Train and Axles	6	11%
D. Suspension and Steering	13	24%
E. Brakes	11	20%
F. Electrical	8	15%
G. Heating, Ventilation, and Air Conditioning	4	7%
Total	55*	100%

* MASWALI KWA KILA SEHEMU UTAKAYO JIFUNZA JUU YA GARI

A. Engine Systems (9 questions)

1. Verify driver's concern and/or road test vehicle; determine necessary action. Utilize service manuals, technical service bulletins (TSBs), and product information.
 2. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
 3. Check for abnormal engine noises.
 4. Inspect and replace pans and covers.
 5. Change engine oil and filter; reset oil life monitor.
 6. Inspect and test radiator, heater core, pressure cap, and coolant recovery system; determine needed repairs; perform cooling system pressure and dye tests.
 7. Inspect, replace, and adjust drive belt(s), tensioner(s), and pulleys.
 8. Inspect and replace engine cooling system and heater system hoses, pipes, and fittings.
 9. Remove and replace engine thermostat and coolant bypass.
 10. Inspect and test coolant; drain, flush, and refill cooling system with recommended coolant; bleed air as required.
 11. Inspect and replace accessory belt driven water pumps.
 12. Confirm fan operation (both electrical and mechanical); inspect fan clutch, fan shroud, and air dams.
 13. Verify operation of engine-related warning indicators.
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14. Perform air induction/ throttle body service.
 15. Inspect, service, or replace air filter(s), filter housing(s), and air intake system components.
 16. Inspect and replace crankcase ventilation system components.
 17. Inspect exhaust system for leaks; check hangers, brackets, and heat shields; determine needed repairs.
 18. Retrieve and record diagnostic trouble codes (DTCs).
 19. Remove and replace spark plugs; inspect secondary ignition components for wear or damage.
 20. Inspect fuel tank, filler neck, fuel cap, lines, fittings, and hoses; replace external fuel filter.
 21. Inspect canister, lines/hoses, and mechanical and electrical components of the evaporative emissions control system (EVAP).
 22. Check and refill diesel exhaust fluid (DEF).

B. Automatic Transmission/Transaxle (4 questions)

1. Road test the vehicle to normal operation; retrieve and record diagnostic trouble codes (DTCs).
2. Determine fluid type, level, and condition.
3. Inspect transmission for leaks; replace external seals and gaskets.
4. Inspect and replace CV boots, axles, drive shafts, U-joints, drive axle joints, and seals.
5. Visually inspect condition of transmission cooling system, lines, and fittings.
6. Inspect and replace power train mounts.
7. Replace fluid and filter(s).

C. Manual Drive Train and Axles (6 questions)

1. Inspect, adjust, replace, and bleed external hydraulic clutch slave/release cylinder, master cylinder, lines, and hoses; clean and flush hydraulic system; refill with proper fluid.
2. Inspect and replace power train mounts.
3. Inspect, adjust, and replace transmission/transaxle external shifter assembly, shift linkages, brackets, bushings/grommets, pivots, and levers.
4. Inspect and replace external seals.
5. Check fluid level; refill with fluid.

► Drive Shaft, Half-Shaft, and Universal Joints/Constant Velocity (CV) Joint (Front and Rear Wheel Drive)

6. Road test the vehicle to verify drive train noises and vibration.
 7. Inspect, service, and replace shafts, yokes, boots, universal/CV joints; verify proper phasing.
 8. Inspect, service, and replace drive shaft center support bearings.
 9. Inspect, service, and replace wheel bearings, seals, and hubs, excluding press-type bearings.
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► **Rear Wheel Drive Axle Inspection**

10. Identify fluid leakage problems.
11. Inspect, drain, and refill with lubricant.
12. Inspect and replace rear axle shaft wheel studs.
13. Inspect axle housing and vent; inspect rear axle mountings.

► **Four Wheel/All Wheel Drive**

14. Inspect, adjust, and repair transfer case manual shifting mechanisms, bushings, mounts, levers, and brackets.
15. Check transfer case fluid level and inspect condition; drain and refill with fluid.
16. Inspect, service, and replace front drive/propeller shaft and universal/CV joints.
17. Inspect front drive axle universal/CV joints and drive/half shafts, axle seals, and vents.
18. Inspect front wheel bearings, seals, and hubs.
19. Inspect transfer case, front differential, and axle seals and vents.
20. Inspect tires for correct size for vehicle application; check for wear.
21. Retrieve and record diagnostic trouble codes (DTCs).
22. Inspect and verify operation of 4WD/AWD system.

D. Suspension and Steering (13 questions)

1. Disarm airbag (SRS) system.
2. Check power steering fluid level; determine fluid type and adjust fluid level; identify system type (electric or hydraulic).
3. Inspect, adjust, and replace power steering pump belt(s), tensioners and pulleys; verify pulley alignment.
4. Identify power steering pump noises, vibration, and fluid leakage.
5. Remove and replace power steering pump; inspect pump mounting and attaching brackets; remove and replace power steering pump pulley; transfer related components.
6. Inspect and replace power steering hoses, fittings, O-rings, coolers, and filters.
7. Inspect and replace rack and pinion steering gear bellows/boots.
8. Flush, fill, and bleed power steering system.
9. Retrieve and record diagnostic trouble codes (DTCs).
10. Inspect electronic suspension components (ride height sensors, wiring, etc.).

► **Steering Linkage**

11. Inspect, adjust (where applicable), and replace pitman arm, center link (relay rod/ drag link/intermediate rod), idler arm(s) and mountings.
12. Inspect, replace, and adjust tie rods, tie rod sleeves/adjusters, clamps, and tie rod ends (sockets/bushings).
13. Inspect and replace steering linkage damper(s).

► **Front Suspension**

14. Identify front suspension system noises, handling, ride height, and ride quality concerns; disable air suspension system.
15. Inspect upper and lower control arms, bushings, and shafts.
16. Inspect and replace rebound and jounce bumpers.

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17. Inspect track bar, strut rods/radius arms, and related mounts and bushings.
 18. Inspect upper and lower ball joints (with or without wear indicators).
 19. Inspect non-independent front axle assembly for damage and misalignment.
 20. Inspect front steering knuckle/spindle assemblies and steering arms.
 21. Inspect front suspension system coil/air springs and spring insulators (silencers).
 22. Inspect front suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts.
 23. Inspect front suspension system torsion bars and mounts.
 24. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.
 25. Inspect front strut cartridge or assembly.
 26. Inspect front strut bearing and mount.
 27. Identify noise and service front wheel bearings/hub assemblies.

► **Rear Suspension**

28. Identify rear suspension system noises, handling, and ride height concerns; disable air suspension system.
29. Inspect rear suspension system coil/air springs and spring insulators (silencers).
30. Inspect rear suspension system lateral links/arms (track bars), and control (trailing) arms.
31. Inspect and replace rear stabilizer bars (sway bars), bushings, and links.
32. Inspect rear suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts.
33. Inspect and replace rear rebound and jounce bumpers.
34. Inspect rear strut cartridge or assembly, and upper mount assembly.
35. Inspect non-independent rear axle assembly for damage and misalignment.
36. Inspect rear ball joints.
37. Inspect and replace rear tie rod/toe linkages.
38. Inspect rear knuckle/spindle assembly.
39. Inspect and replace shock absorbers, mounts, and bushings.
40. Identify noise related concerns and service rear wheel bearings/hub assemblies.
41. Identify driver assist systems, if applicable.

► **Wheel Alignment**

42. Identify alignment-related symptoms such as vehicle wander, drift, and pull.
43. Perform pre-alignment inspection; prepare vehicle for alignment, and perform initial wheel alignment measurements.
44. Measure front and rear wheel camber; adjust as needed.
45. Measure caster; adjust as needed.
46. Measure front wheel toe; adjust as needed.
47. Center the steering wheel using mechanical methods.
48. Measure rear wheel toe; adjust as needed.
49. Measure thrust angle.
50. Calibrate steering angle sensor.

► **Wheel and Tires**

51. Identify tire wear patterns.
52. Inspect tire condition, tread depth, size, and application (load and speed ratings).
53. Check and adjust tire air pressure. Utilize vehicle tire placard and information.

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54. Diagnose wheel/tire vibration, shimmy, and noise concerns; determine needed repairs.
 55. Rotate tires/wheels and torque fasteners/wheel locks.
 56. Dismount and mount tire on wheel.
 57. Balance wheel and tire assembly.
 58. Identify and test tire pressure monitoring systems (TPMS) (indirect and direct) for operation. Verify instrument panel lamps operation; conduct relearn procedure.
 59. Repair tire according to tire manufacturers' standards.

E. Brakes (11 questions)

1. Check for poor stopping, pulling, dragging, noises, high or low pedal, and hard or spongy pedal.
 2. Check the master cylinder fluid level and condition; inspect for external fluid leakage.
 3. Inspect flexible brake hoses, brake lines, valves, and fittings for routing, leaks, dents, kinks, rust, cracks, or wear; inspect for loose fittings and supports; determine needed repairs.
 4. Verify operation of brake warning light and ABS warning light; inspect brake system wiring damage and routing.
 5. Test parking brake indicator light, switch, and wiring.
 6. Bleed and/or flush hydraulic system.
 7. Select, handle, store, and install proper brake fluids.
- **Drum Brakes**
8. Remove, clean, inspect, and measure brake drums; follow manufacturers' recommendations in determining need to machine or replace.
 9. Machine drums according to manufacturers' procedures and specifications.
 10. Using proper safety procedures, remove, clean, and inspect brake shoes/linings, springs, pins, self-adjusters, levers, clips, brake backing (support) plates, and other related brake hardware; determine needed repairs.
 11. Lubricate brake shoe support pads on backing (support) plate, self-adjuster mechanisms, and other brake hardware.
 12. Inspect wheel cylinder(s) for leakage, operation, and mounting; remove and replace wheel cylinder(s).
 13. Install brake shoes and related hardware.
 14. Adjust brake shoes and parking brake.
 15. Check parking brake system operation; inspect cables and components for wear, rust, and corrosion; clean or replace components as necessary; lubricate and adjust assembly.
 16. Reinstall wheel, torque lug nuts, and make final brake checks and adjustments.
- **Disc Brakes**
17. Retract integral parking brake caliper piston(s) according to manufacturers' recommendations.
 18. Remove caliper assembly from mountings; inspect for leaks and damage to caliper housing.

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19. Clean and inspect caliper mountings and slides/pins for wear and damage.
 20. Remove, clean, and inspect pads and retaining hardware; determine needed repairs, adjustments, and replacements.
 21. Clean caliper assembly; inspect external parts for wear, rust, scoring, and damage; replace any damaged or worn parts; determine the need to repair or replace caliper assembly.
 22. Clean, inspect, and measure rotors with a dial indicator and a micrometer; determine the need to index, machine, or replace the rotor.
 23. Remove and replace rotors.
 24. Machine rotors, using on-car or off-car method.
 25. Install pads, calipers, and related attaching hardware; lubricate components; bleed system.
 26. Adjust calipers with integral parking brakes.
 27. Fill master cylinder with recommended fluid; reset system.
 28. Reinstall wheel, torque lug nuts, and make final brake checks and adjustments.
 29. Road test vehicle and burnish/break-in pads according to manufacturers' recommendations.

► **Power Assist Units**

30. Test brake pedal free travel with and without engine running to check power booster operation.
31. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
32. Inspect the vacuum-type power booster unit for operation, and vacuum leaks; inspect the check valve for proper operation.
33. Identify operation of electric-hydraulic assist system; check system for leaks and operation.
34. Identify operation of hydro-boost assist system; check system for leaks and operation.

F. Electrical (8 questions)

1. Disarm/re-enable air bag; verify lamp operation.
2. Check voltages, grounds, and voltage drops in electrical circuits; interpret readings.
3. Check current flow in electrical circuits and components; interpret readings.
4. Check continuity and resistances in electrical circuits and components; interpret readings.
5. Perform battery tests (load and capacitance); determine needed service.
6. Maintain or restore electronic memory functions.
7. Inspect, clean, fill, or replace battery.
8. Perform slow/fast battery charge in accordance with manufacturers' recommendations.
9. Inspect, clean, and repair or replace battery cables, connectors, clamps, and hold-downs.
10. Jump-start a vehicle with a booster battery or auxiliary power supply.

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11. Perform starter current draw test; interpret readings.
 12. Inspect switches, connectors, and wires of starter control circuits.
 13. Remove and replace starter.
 14. Perform charging system output test and identify undercharge, no-charge, or overcharge condition.
 15. Inspect, adjust, and replace generator (alternator) drive belts, pulleys, and tensioners.
 16. Remove, inspect, and replace generator (alternator).
 17. Inspect, replace, and aim headlights/bulbs and auxiliary lights (fog lights/driving lights).
 18. Inspect interior and exterior lamps and sockets; repair as needed.
 19. Inspect lenses; determine needed repairs.
 20. Verify instrument gauges and warning/indicator light operation; reset maintenance indicators.
 21. Verify horn operation; determine needed repairs.
 22. Verify wiper and washer operation; replace wiper motor, blades, washer pump, and hoses and nozzles as needed.

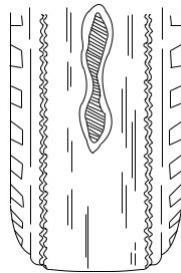
G. Heating, Ventilation, and Air Conditioning (4 questions)

1. Verify HVAC operation (vent temperature, blower and condenser fan, compressor engagement, blend and mode door(s) operation).
2. Identify A/C refrigerant type; recover and recharge system per manufacturer's specifications.
3. Visually check A/C components for signs of leaks.
4. Inspect A/C condenser for restricted air flow.
5. Inspect and replace cabin air filter.
6. Check drive belt for wear and tension; adjust or replace as needed.
7. Inspect and clean evaporator drains. ■

Sample Questions Auto Maintenance and Light Repair (Test G1)

1. When changing the engine oil filter, the technician should:
 - (A) install the filter with pliers.
 - (B) tighten the new filter two turns after seal contact.
 - * (C) inspect the oil flange for the old filter seal.
 - (D) install the filter with a dry seal.

2. When pressure testing an engine cooling system, the technician should pressurize the system to:
 - * (A) the radiator cap's specified pressure.
 - (B) twice the radiator cap's specified pressure.
 - (C) half the radiator cap's specified pressure.
 - (D) three times the radiator cap's specified pressure.



3. The tire wear in the illustration shown could be caused by:
 - (A) camber wear.
 - (B) toe wear.
 - (C) under-inflation.
 - * (D) over-inflation.

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4. The tire pressure monitoring system (TPMS) light is illuminated on a vehicle equipped with direct TPMS. Technician A says that low air pressure in the spare tire could be the cause. Technician B says that inflating the tires to the proper pressure using nitrogen could be the cause. Who is right?
- * (A) A only
 - (B) B only
 - (C) Both A and B
 - (D) Neither A nor B
5. Brake fluid that is not in use should be kept in a closed container to prevent:
- (A) the spread of toxic fumes.
 - (B) evaporation.
 - (C) the possibility of fire.
 - * (D) moisture contamination.

This question contains the word EXCEPT. Read the question carefully before choosing your answer.

6. Tire sidewalls include all of the following items EXCEPT:
- (A) tire manufacturer.
 - (B) load class.
 - * (C) minimum tread depth.
 - (D) manufacture date.
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