National Vocational Certificate Level 2 in Automotive Technology (Automobile Mechanics)

Competency Standards

NATIONAL VOCATIONAL & TECHNICAL TRAINING COMMISSION

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Title A. Complete Documentation Requirement

Overview: This Competency Standard identifies the competencies required to complete documentation requirement, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to verify customer complaint and complete work estimate at all times, at workplace. Your underpinning knowledge regarding completion of documentation requirement will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
A1. Verify customer complaint	You will be able to: P1. Record customer complaint as per organizational procedure P2. Conduct root cause analysis to investigate customer complaint P3. Perform test drive to isolate the problem P4. Arrange tools and equipment required for diagnosing P5. Follow safety precautions at workplace P6. Finalize the customer concern regarding complaint as per organizational procedure	You will be able to: K1. Define job/repair order K2. Organizational reporting procedures K3. Explain how to conduct root cause analysis K4. Describe the functions of vehicle systems K5. Describe the usage of tools and equipment for diagnosing K6. Explain the safety precautions regarding personal health and workplace	Testers, scanners, sound detectors, Digital multi-meters, analyzers, gauges, job card/repair order

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
A2. Prepare Work estimate	You will be able to: P1. Prepare a cost estimate form based on diagnose result including: • Labour cost • Parts cost • Sublet cost P2. Prepare time estimate form based on diagnose result	You will be able to: K1. Explain the functions of different components of vehicle K2. Describe the types of inventory system K3. Define flat rate time (FRT) K4. Explain the usage of repair manual K5. Explain market trends in pricing of labour and parts	Repair manual, Flat rate time (FRT). Estimation forms,

Title B: Perform Preventive Maintenance

Overview: This Competency Standard identifies the competencies required to perform preventive maintenance, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to Verify vehicle specific maintenance schedule, Conduct under vehicle inspection, Inspect all lubricants of the vehicle and conduct road test at all times, at workplace. Your underpinning knowledge regarding preventive maintenance will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
B1. Verify vehicle specific maintenance schedule	You will be able to: P1. Record time period/ millage of vehicle for maintenance schedule P2. Implement the maintenance schedule as per requirement	You will be able to: K1. Explain the periodic maintenance schedule and its importance	Repair manual
B2. Conduct under vehicle inspection (e.g., exhaust system, fluid leaks)	You will be able to: P1. Arrange tools and equipment required for vehicle inspection P2. Follow organizational guidelines for inspection of vehicle P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for vehicle inspection K2. Read and interpret repair manual K3. Explain the safety precautions regarding personal health and workplace	Lifts, jacks, spanners, wrenches, hammers, socket set, screw driver, plier, filter spanner, special service tool (SST), PPEs
B3. Inspect all lubricants of the vehicle	You will be able to: P1. Record the time period/millage of vehicle for lubricant maintenance schedule	You will be able to: K1. Describe the usage of lubricants used in vehicle	Spanners, socket set, oil filler gun, oil transfer equipment, funnel, repair manual

	P2 Inspect the following lubricants according to repair manual : • Transmission fluid • Brake/clutch fluid • Engine oil • Power stirring fluid • Suspension fluid • Differential fluid P3. Follow safety precautions at workplace	K2. Explain the levels and grading of lubricants K3. Identify the bad effects of lubricants on human health and environment e.g: brake fluid, used engine oil K4. Explain the storage and disposal of lubricants K5. Read and interpret repair manual	
B4. Conduct road test of vehicle	You will be able to: P1. Follow the organizational policy regarding road test P2. Verify the followings on road test following organizational guidelines: • Function of gauges • Drivability performance • Tracking performance • Braking performance • Noises • Vibrations • Engine performance P3. Follow safety precautions while driving	You will be able to: K1. Explain organizational rules, regulations and policies regarding road test K2. Describe organizational standard operating procedures (SOPs) K3. Explain the function of gauges K4. Explain how to check the performance of vehicle K5. Identify different types of noises and vibrations K6. Explain local driving laws	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license

Title C: Maintain Brake System

Overview: This Competency Standard identifies the competencies required to maintain brake system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to perform inspection and diagnoses of brakes, rebuild/replace brake Master cylinder, rebuild/replace wheel cylinders of vehicle, rebuild/replace calipers of vehicle, service parking brake system of vehicle, bleed brake system of vehicle, diagnose fault codes of ABS/TCS/VSA, service ABS/TCS/VSA systems of vehicle and road test vehicle to verify repair, at workplace. Your underpinning knowledge regarding maintenance of brake systems of a vehicle will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
C1 Perform inspection & diagnosis of brakes	You will be able to: P1. Carry out a road test to diagnose faults in brake system P2. Inspect the followings on road test: • Vibration on brake paddle • Abnormal Noise • Brake grip • Anti-lock brake system (ABS) • Left right pulling • Brake performance P3. Arrange tools and equipment required for brake inspection P3. Inspect the followings at workplace according to repair manual:	You will be able to: K1. Explain organizational rules, regulations and policies regarding road test K2. Describe organizational standard operating procedures (SOPs) K3. Explain braking system of vehicle K4. Explain ABS system K5. Read and interpret repair manual K6. Explain the application and importance of measuring tools K7. Describe the procedure to check the run out of disc plate	Scanner, SSTs, repair manual, vernier caliper, dial indicator gauge, wheel spanner, spanner set, socket set, PPEs

	• Brake oil • Disc pad and brake shoe thickness • Disc plate/brake drum surfaces • Brake calipers • ABS/VSS (vehicle speed sensor) sensors • Brake master cylinder • Wheel cylinders • Hand brake cables • Brake booster P4. Follow safety precautions while driving and at workplace	K8. Explain how to check the ABS sensors and modulator through scanner K9. Explain local driving laws K10. Explain the safety precautions regarding personal health and workplace	
C2 Rebuild/ replace brake master Cylinder of vehicle	You will be able to: P1: Arrange tools and equipment required to rebuild/replace brake master cylinder P2. Follow the instructions of repair manual to rebuild/replace brake master cylinder P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for rebuild/replace brake master cylinder K2. Read and interpret repair manual K3. List the adverse effects of brake fluid on human health, vehicle body and workplace	SSTs, spanners, repair manual, bleeding kit, bench vice, personal protective equipment (PPE)
C3 Rebuild/ replace wheel cylinders of vehicle	You will be able to: P1: Arrange tools and equipment required to rebuild/replace wheel cylinder P2. Follow the instructions of repair manual to rebuild/replace wheel cylinder P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for rebuild/replace wheel cylinder K2. Read and interpret repair manual K3. Explain the safety precautions regarding personal health and workplace	Jacks, safety stand, technician stretcher, spanners, socket set, SSTs, bleeding kit, repair manual, personal protective equipment (PPE)
C4. Rebuild/replace	You will be able to:	You will be able to:	Jacks, safety stand, spanners, socket set, SSTs,

Calipers of vehicle	P1: Arrange tools and equipment required to rebuild/replace calipers P2. Follow the instructions of repair manual to rebuild/replace calipers P3. Follow safety precautions at workplace	K1. Explain the usage of tools and equipment for rebuild/replace calipers K2. Read and interpret repair manual K3. Explain the safety precautions regarding personal health and workplace	bleeding kit, back winding tool, bench vice,repair manual, personal protective equipment (PPE)
C5 Service parking brake system of vehicle	You will be able to: P1: Arrange tools and equipment required to service parking brake system P2. Follow the instructions of repair manual to service parking brake system P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing parking brake system K2. Read and interpret repair manual K3. Identify the types of parking brake system K4. Explain the safety precautions regarding personal health and workplace	Jack, safety stand, Screw driver, spanners, amery paper, Personal protective equipment (PPE)
C6 Bleed brake system of vehicle	You will be able to: P1: Arrange tools and equipment required to bleed brake system P2. Follow the instructions of repair manual to bleed brake system P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing parking brake system K2. Read and interpret repair manual K3. Describe the methods of bleeding brake system K4. Explain the grading of brake fluid K5. Explain the safety precautions regarding personal health and workplace	Bleeding kit, scanners, SSTs, spanners, personal protective equipment (PPE), repair manual
C7. Diagnose fault	You will be able to:	You will be able to:	Scanners, spanners, electric wiring diagram (EWD),

codes of ABS/TCS/VSA	P1: Arrange tools and equipment required to diagnose ABS fault codes P2. Follow the instructions of repair manual to diagnose ABS/TCS (traction control system)/VSA (vehicle stability assist) fault codes P3. Follow the Electric wiring diagram (EWD) for electrical diagnoses of ABS system P4. Follow safety precautions at workplace	K1. Explain the usage of tools and equipment for diagnosing faults in ABS K2. Read and interpret EWD K3. Read and interpret repair manual K4. Explain the safety precautions regarding personal health and workplace	repair manual, multi-meter, test lamp, cutter plier, screw driver, PPE
C8 Service ABS/TCS/VSA systems of vehicle	You will be able to: P1: Arrange tools and equipment required to service ABS/TCS/VSA P2. Follow the instructions of repair manual to service ABS/TCS/VSA P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment to service ABS/TCS/VSA K2. Read and interpret EWD K3. Read and interpret repair manual K4. Explain the safety precautions regarding personal health and workplace	Scanners, spanners, EWD, repair manual, multi-meter, insulation tape, test lamp, cutter plier, screw driver, PPE
C9. Conduct Road test of vehicle to verify repair	You will be able to: P1. Follow the organizational policy regarding road test P2. Verify the followings on road test according to organizational guidelines: • Function of ABS • Drivability performance • Tracking performance	You will be able to: K1. Explain organizational rules, regulations and policies regarding road test K2. Describe organizational standard operating procedures (SOPs) K3. Explain the function of brake system	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license

	• Braking performance • Parking brake performance • Noises • Vibrations P3. Follow safety precautions while driving	K4. Explain how to check the brake performance of vehicle K6. Explain local driving laws	

Title D. Maintain Engine

Overview: This Competency Standard identifies the competencies required to maintain engine of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to diagnose engine problems of vehicle, Service engine gasket of vehicle, Service engine seals of vehicle, service engine cooling system of vehicle, service engine lubrication system of vehicle, service valve train components of vehicle and service engine block components of vehicle, at workplace. Your underpinning knowledge regarding maintenance of engine of vehicle will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
D1 Diagnose engine problems of vehicle	You will be able to: P1: Arrange tools and equipment required to diagnose problems of engine P2. Follow the instructions of repair manual to diagnose problems of engine P3. Inspect the followings in engine of vehicle according to repair manual: • Abnormal noises • Engine combustion • Ignition • Oil leakages • Vacuum and pressure leakages • Water leakages • Over heat • Drive belts • Fuel system P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for diagnosing engine problems K2. Read and interpret repair manual K3. Describe the function of engine components K4. Explain the types of engine K5. Explain the safety precautions regarding personal health and workplace	Spanners, socket set, pliers, screw drivers, compression gauge, fuel pressure gauge, filler gauge, oil pressure gauge, scanner, off-car injector simulator, repair manual, PPE
D2. Service engine gaskets (e.g., head, manifold) of vehicle	You will be able to: P1: Arrange tools and equipment required to service engine gaskets P2. Follow the instructions of repair manual to	You will be able to: K1. Explain the usage of tools and equipment for servicing engine gaskets K2. Read and interpret repair manual	spanners., socket set, torque wrench, T handles, screw drivers, scrappers, nose plier, repair manual, PPE

	service engine gaskets P3. Inspect the following gaskets of engine according to repair manual: • Head gasket • In take manifold gasket • Exhaust manifold gasket • Tappet cover gasket • Oil pan gasket • Water pump gasket P4. Follow safety precautions at workplace	K3. Describe the function of gaskets K4. Explain the types of gaskets K5. Explain the safety precautions regarding personal health and workplace	
D3 Service engine seals of vehicle (rear main)	You will be able to: P1: Arrange tools and equipment required to service engine seals of vehicle P2. Follow the instructions of repair manual to service engine seals of vehicle P3. Inspect the following seals of engine according to repair manual: • Main oil seal • Crank shaft seal • Cam shaft seal • Distributor shaft seal • Valve seal • Oil pump seal • VVTI valve seal • Injector seal P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing engine gaskets K2. Explain the usage of special service tools (SSTs) for removing and fixing seals K3. Read and interpret repair manual K4. Describe the function of oil seals K5. Outline the specifications of oil seals K6. Explain the safety precautions regarding personal health and workplace	SSTs, screw drivers, spanners, T handles, socket sets, plastic hammer, repair manual, torque wrench, PPE

D4 Service engine cooling system (e.g.water pump, radiator, coolant flush) of vehicle	You will be able to: P1: Arrange tools and equipment required to Service engine cooling system P2. Follow the instructions of repair manual to Service engine cooling system P3. Inspect the level and quality of the coolant according to repair manual P4. Inspect the following components of the cooling system of vehicle according to repair manual: • Radiator • Hose pipes • Water pump • Water jacket • Thermostat valve • Radiator fan • Radiator pressure cap • Radiator reservoir • Radiator coolant • Automatic fan switch • Temperature sensor • Drive belts • Hose pipes clamp P5. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing engine cooling system K2. Explain the usage of special service tools (SSTs) for cooling system K3. Read and interpret repair manual K4. Describe the properties of radiator coolant K5. Describe the properties of radiator hoses K6. Describe the function of radiator pressure cap K8. Explain the safety precautions regarding personal health and workplace	SSTs, spanners, pliers, repair manual, screw drivers, thermometer, scanner, PPE

D5. Service engine lubrication system (e.g., oil pump) of vehicle	You will be able to: P1: Arrange tools and equipment required to Service engine lubrication system P2. Follow the instructions of repair manual to Service engine lubrication system P3. Inspect the level and quality of lubricants used in vehicle, according to repair manual P4. Inspect the following components of the lubricating system of vehicle according to repair manual: • Oil pump • Oil galleries • Oil filter • Oil pressure switch • Oil pan • Oil pump stainer • Engine oil P5. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing engine lubrication system K2. Explain the usage of special service tools (SSTs) for engine lubrication system K3. Read and interpret repair manual K4. Describe the properties of engine oil K5. Describe the function of oil and oil filter K6. Describe the working principle of oil pressure switch K7. Describe the types and functions of oil pump K8. Explain the safety precautions regarding personal health and workplace	SSTs, spanners, socket set, torque wrench, funnel, repair manual, PPE
D6 Service valve train components of vehicle	You will be able to: P1: Arrange tools and equipment required to Service valve train components P2. Follow the instructions of repair manual to Service valve train components P3. Inspect the following components of the valve train components according to repair manual:	You will be able to: K1. Explain the usage of tools and equipment for servicing valve train components K2. Explain the usage of special service tools (SSTs) for servicing valve train components K3. Read and interpret repair manual	Spanner set, screw drivers, socket set, filler gauge, SSTs, repair manual, plier, bench vice, PPE

	• In take valve • Exhaust valve • Valve guide • Valve spring • Retainer washer • Rocker arm • Rocker arm shaft • Cam shaft • VVTI / VTec solenoid valves • Cam shaft position sensor P5. Follow safety precautions at workplace	K4. Describe the function of VVTI/VTec K5. Explain how to check valve seats K6. Explain how to check valve clearance K7. Explain the function of cam sensor K8. Explain the safety precautions regarding personal health and workplace	
D7 Service Engine Block Components of vehicle	You will be able to: P1: Arrange tools and equipment required to Service engine block components P2. Follow the instructions of repair manual to Service engine block components P3. Inspect the following components of the engine block components according to repair manual: • Piston • Connecting rods • Main shell bearings • Big ends bearings • Thrust washers • Crank shaft • Crank shaft sensor • Crank shaft pulser • Block sleeves	You will be able to: K1. Explain the usage of tools and equipment for servicing engine block components K2. Explain the usage of special service tools (SSTs) for servicing engine block components K3. Read and interpret repair manual K4. Identify the noises of main bearings, connecting rods and piston pins K6. Explain the function of crank shaft sensor and crank shaft pulser K7. Explain the role of piston and piston rings K8. Explain the role of block sleeves K9. Explain the safety precautions regarding personal health and workplace	SSTs, ring compressor, torque wrench, screw drivers, repair manual, socket set, plastic hammer, PPEs

	• Rod bush P5. Follow safety precautions at workplace		

TITLE E. Maintain Fuel System

Overview: This Competency Standard identifies the competencies required to maintain fuel system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to diagnose fuel system problems of vehicle and service fuel metering system of vehicle ,at workplace. Your underpinning knowledge regarding maintenance of fuel system of a vehicle will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
E1. Diagnose fuel system problems of vehicle	You will be able to: P1: Arrange tools and equipment required to diagnose fuel system problems P2. Follow the instructions of repair manual to diagnose fuel system problems P3. Inspect the following components of fuel system according to repair manual: • Fuel pump • Fuel pump motor • Fuel pressure regulator • Fuel damper • Fuel injectors • Supply lines • Fuel filter • Fuel gauge • Fuel injector gallery • O rings P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for diagnose fuel system K2. Explain the usage of special service tools (SSTs) for fuel system K3. Read and interpret repair manual K4. Describe the properties of gasoline K6. Describe the function of fuel pump motor K6. Describe the function of fuel filter K6. Describe the function of fuel damper K6. Describe the function of fuel pressure regulator K6. Describe the function of fuel injector K8. Explain the safety precautions regarding personal health and workplace	Repair manual, spanner, gauges, sockets set, pliers, SST ,lock pliers, scanner , off car injector simulator ,PPE
E2. Service fuel metering System (e,g. injectors, regulators, switching valve) of vehicle	You will be able to: P1: Arrange tools and equipment required to service fuel metering system P2. Follow the instructions of repair manual to service fuel metering system	You will be able to: K1. Explain the usage of tools and equipment for servicing fuel metering system K2. Explain the usage of special service tools (SSTs) for servicing fuel metering system	SSTs, Scanner, multi meter, off car injector simulator, screw drivers, spanners, pliers, socket set, repair manual, star Allen keys, PPEs

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
	P3. Inspect the following components of fuel metering system according to repair manual: • Engine control module (ECM) • Air flow sensor • Heated oxygen sensor • Map sensor • In take air temperature sensor (IAT) • Throttle position sensor • Coolant temperature sensor • In take air control valve (IACV) P4. Follow safety precautions at workplace	K3. Read and interpret repair manual K4. Explain the functions of electronic fuel injection system (EFI) K5. Explain the function of all sensors of fuel metering system K6. Explain the function of ECM and injector in fuel metering system K7. Explain the safety precautions regarding personal health and workplace	

TITLE F: Perform Ignition System Service

Overview: This Competency Standard identifies the competencies required to perform service of ignition system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to diagnose ignition system problems of vehicle, service distributor and C.B point of ignition system and Service spark plugs & wires of vehicle, service emission

control system of vehicle and perform ignition road test of vehicle ,at workplace. Your underpinning knowledge regarding service of ignition system of a vehicle will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
F-1 Diagnose ignition system problems (e.g., scan tool, scope) of vehicle	You will be able to: P1: Arrange tools and equipment required to diagnose ignition system problems P2. Follow the instructions of repair manual to diagnose ignition system problems P3. Inspect the following components of ignition system according to repair manual: • Ignition switch • Ignition coil • Spark plug wires • Spark plug • Battery • Distributor • Contact breaker point (CB) • Resistance • Condenser • Crank sensor • Cam sensor • Electronic control module (ECM) P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for diagnosing ignition system problems K2. Explain the usage of special service tools (SSTs) for diagnosing ignition system problems K3. Read and interpret repair manual K4. describe the electronic ignition system K5. Describe the distributor ignition system K5. Explain the function of sensors and actuators of ignition system K6. Explain the function of ECM in ignition system K7. Explain the safety precautions regarding personal health and workplace	Scanner, repair manual, multi meter, oscilloscope, lamp tester, spanners, socket set, T handles, magnetic stick, hydro meter, PPE

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
F-2 Service Distributor and C.B point of ignition system	You will be able to: P1: Arrange tools and equipment required to service distributor and C.B point P2. Follow the instructions of repair manual to service distributor and C.B point P3. Inspect the following components of distributor according to repair manual: • Contact breaker (C.B) point • Condenser • Router • Distributor cap • Router shaft • Advance plate • Governor weights • Advance vacuum mechanism P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing distributor and C.B point K2. Explain the usage of ignition timing gun K3. Read and interpret repair manual K4. Explain the dwell angle of C.B point K5. Explain the sequence of firing order K6. Explain the safety precautions regarding personal health and workplace	Repair manual, ignition timing gun, spanner, filler gauge, star Allen keys, analyser, screw drivers, plier, PPE
F3 Service spark plugs & wires of vehicle	You will be able to: P1: Arrange tools and equipment required to service spark plugs and wires P2. Follow the instructions of repair manual to service spark plugs and wires P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing spark plugs and wires K2. Explain the usage of multi meter K3. Read and interpret repair manual K4. Identify the types and range of spark plugs K5. Describe the clearance of spark plugs K6. Explain the resistance of spark plug wires K7. Explain the safety precautions regarding personal health and workplace	Multi meter, filler gauge, socket set, plug cleaner, T handles, repair manual, PPE

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
F4. Service emission control System of vehicle	You will be able to: P1: Arrange tools and equipment required to service emission control system P2. Follow the instructions of repair manual to service emission control system P3. Inspect the following components of distributor: • Catalytic convertor • Charcoal canister • Purge valve • Positive crankcase ventilation valve (PCV) • Fuel tank • Fuel tank lid • Exhaust gases recirculation valve (EGR) • Heated oxygen sensors (H2OS) P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing emission control system K2. Explain the usage of special service tools (SSTs) for servicing emission control system K3. Read and interpret repair manual K4. Explain the emission control system K5. Describe the function of catalytic convertor K6. Describe the function of exhaust gases recirculation valve (EGR) K7. Explain the safety precautions regarding personal health and workplace	SSTs, Scanner, repair manual, exhaust gas analyzer, back pressure tester, spanners, socket set, screw drivers, vacuum tester, PPE
F5. Perform ignition road test of vehicle	You will be able to: P1. Follow the organizational policy regarding road test P2. Verify the followings on road test according to organizational guidelines: • Pick up • Juttring • Drivability P3. Follow safety precautions while driving	You will be able to: K1. Explain organizational rules, regulations and policies regarding road test K2. Describe organizational standard operating procedures (SOPs) K3. Explain the method of checking performance of vehicle K4. Explain local driving laws	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license

Title G. Maintain Suspension/Steering Systems

Overview: This Competency Standard identifies the competencies required to perform service of ignition system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. You will be expected to diagnose ignition system problems of vehicle, service distributor and C.B point of ignition system and Service spark plugs & wires of vehicle, service emission control system of vehicle and perform ignition road test of vehicle ,at workplace. Your underpinning knowledge regarding service of ignition system of a vehicle will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
G1. Diagnose steering and/or suspension problems of vehicle	You will be able to: P1: Arrange tools and equipment required to diagnose steering/suspension problems P2. Follow the instructions of repair manual to diagnose steering/suspension problems P3. Inspect the following components of steering/suspension system according to repair manual: • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power motor (EPS) • Power steering pump • Shock absorbers • Lower control arms • Upper control arms • Ball joints • Rack end set • Tie rod end set • Stabilizer bar • Z links	You will be able to: K1. Explain the usage of tools and equipment for diagnosing steering/suspension problems K2. Explain the usage of special service tools (SSTs) for diagnosing steering/suspension problems K3. Read and interpret repair manual K4. describe the types of steering K5. Describe the function of scanner for electric power steering K6. Describe the function of power steering pump K6. Describe the role of stabilizer bar K7. Describe the geometry of suspension system of vehicle K8. Describe the function of shock absorber K9. Describe the turning radius of steering system K10. Describe the function of leaf spring	Jack, safety stand, Wheel aligner, wheel balancer, hammers, ball joint opener, tire lever, wheel spanner, spanner set, SSTs, air pressure gauge, sockets, screw drivers, lift, PPE

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
	• Coil springs • Leaf springs • Shock mounting P4. Follow safety precautions at workplace	K11. Explain the safety precautions regarding personal health and workplace	

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
G2. Service suspension components of vehicle	You will be able to: P1: Arrange tools and equipment required to service suspension components P2. Follow the instructions of repair manual to service suspension components P3. Service the following components of suspension system according to repair manual: • Hub knuckle • Wheel hub • hub stud • Springs • Shock absorber • Sway bar • Z link • Control arm • Ball joints P4. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing suspension components K2. Explain the usage of special service tools (SSTs) for service suspension components K3. Read and interpret repair manual K4. Explain the types of suspension system K5. Describe the function of bushes K6. Describe the function of wheel hub bearing K7. Identify the noises of wheel bearings K8. Describe the types and function of shock absorber K9. Describe the types and function of springs K10. Describe the function stabilizer bar K11. Describe the function of ball joints and control arms K12. Explain the safety precautions regarding personal health and workplace	Jack, safety stand, hammers, ball joint opener, tire lever, wheel spanner, spanner set, scanner, SSTs, sockets, screw drivers, lift, bench vice, PPE
G3. Service steering system of vehicle	You will be able to: P1: Arrange tools and equipment required to service steering system of vehicle P2. Follow the instructions of repair manual to service	You will be able to: K1. Explain the usage of tools and equipment for servicing steering system of vehicle K2. Explain the usage of special service tools (SSTs) for	Jack, safety stand, Wheel aligner, wheel balancer, hammers, wheel spanner, spanner

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
	steering system of vehicle P3. Service the following components of steering system according to repair manual: • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power steering (EPS) • Power steering pump P3. Follow safety precautions at workplace	servicing steering system of vehicle K3. Read and interpret repair manual K4. describe the types of steering K5. Describe the function of scanner for electric power steering K6. Describe the function of power steering pump K7. Describe the geometry of steering system of vehicle K8. Describe the turning radius of steering system K9. Describe the importance of power steering fluid K10. Explain the safety precautions regarding personal health and workplace	set, SSTs, air pressure gauge, sockets, screw drivers, lift, PPE

Title H. Maintain Drive line systems

Overview: This Competency Standard identifies the competencies required to maintain drive line systems by automobile mechanic in accordance with the organization's approved guidelines and procedures. You will be expected to Service manual clutch systems and automatic transmissions of vehicle, at workplace. Your underpinning knowledge regarding maintenance of drive line systems will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
H1. Service manual clutch systems of vehicle	You will be able to: P1: Arrange tools and equipment required to service manual clutch system of vehicle P2. Follow the instructions of repair manual to service manual clutch system of vehicle P3. Service the following components of manual clutch system according to repair manual: • Clutch master cylinder (CMC) • Clutch plate • Pressure plate • Clutch release bearing • Clutch release fork • Fly wheel • Clutch cable • Gear shifting lever and linkage • Vehicle speed sensor • Synchronizer • Differential • Drive shafts • Gear oil • Gear box seals P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing manual clutch system of vehicle K2. Explain the usage of special service tools (SSTs) for servicing manual clutch system of vehicle K3. Read and interpret repair manual K4. Describe the function of clutch master cylinder and clutch wire K6. Describe the mechanism of clutch set K7. Describe the function of clutch bearing K8. Describe the function of differential K9. Describe the grading of fluid used in clutch system K10. Explain how to check the efficiency of clutch plate K11. Explain the safety precautions regarding personal health & workplace	Jack, safety stand, lift, spanner set, socket set, oil gun, SSTs, repair manual, screw drivers, hammers, lock pliers, PPE

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
H2. Service automatic Transmission of vehicle	You will be able to: P1: Arrange tools and equipment required to service automatic transmission of vehicle P2. Follow the instructions of repair manual to service automatic transmission of vehicle P3. Service the following components of automatic transmission according to repair manual: • Torque convertor • Gear shifting lever and linkage • Vehicle speed sensor • Gear shifting Solonide valve • Differential • Valve body • Drive shafts • Automatic transmission fluid (ATF) • Gear box seals • Continuous variable transmission (CVT) • Electronic transmission (ECT) P3. Follow safety precautions at workplace	You will be able to: K1. Explain the usage of tools and equipment for servicing automatic transmission of vehicle K2. Explain the usage of special service tools (SSTs) for servicing automatic transmission of vehicle K3. Read and interpret repair manual K4. Describe the function of torque convertor K5. Describe the function of gear shifting lever and linkages K6. Describe the function of solenoid valves K7. Describe the grading of fluid used in automatic transmission K8. Describe the function of differential K9. Explain how to conduct stall speed test K10. Explain how to check the fluid level of automatic transmission K11. Describe the function of Continuous variable transmission (CVT) K12. Describe the function of electronic control transmission (ECT)	Jack, safety stand, lift, scanner, spanner set, socket set, fluid filler gun, SSTs, repair manual, screw drivers, stall speed test gauge, hammers, lock pliers, PPE

Unit of Competency	Performance Criteria	Knowledge & Understanding	Tools & Equipment
		K11. Explain the safety precautions regarding personal health and workplace	

TITLE I: Apply Safety Precautions and Guidelines at Workplace

Overview: This Competency Standard identifies the competencies required to apply occupational health and safety procedures at workplace by auto electrician in accordance with the organization's approved guidelines and procedures. You will be expected to identify hazards in workplace, comply health and safety precautions, use of personal protective equipment and practicing safe work habits at workplace at all times. Your underpinning knowledge regarding occupational health and safety procedures will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge and Understanding	Tools & Equipment
I1. Identify hazards in workplace environment	*You must be able to:* P1. Read and interpret work processes and procedures correctly to identify risk of hazards at workplace. P2. Recognize processes, tools, equipment and consumable materials that have the potential to cause harm. P3. Identify any potential hazards and take appropriate action to minimize the risk.	*You must know and understand:* K1. Define Health and safety precautions of the company. K2. Explain Techniques and methods to identify the risks of hazards at workplace. K3. Carefully dealing with hazards to avoid any accident or injury. K4. Describe safety reporting procedures and documentation.	Health and safety manual.
I2. Comply with Occupational Health and Safety Precautions	*You must be able to:* P1. Work safely at all times, complying with health and safety precautions, regulations and other relevant guidelines. P2. Identify health and safety hazards in the workplace, so that the potential for personal injury, damage to equipment or the workplace is prevented, and corrective action is taken. P3. Deal with problems which are within your control, and report those that cannot be resolved to safety officer.	*You must know and understand:* K1. Define Organizational health and safety procedures. K2. Precaution Health and safety risks that can arise as a result of accidents. K3. Precaution of hazards that are most likely to cause harm to health and safety. K4. Explain the procedure of implementing 5s	Safety shoes, Safety gloves, Safety goggles, Safety helmet, Fire extinguisher, Smoke alarm, First aid box, Wheel chair, stretcher

Unit of Competency	Performance Criteria	Knowledge and Understanding	Tools & Equipment
I3. Apply Personal Protective and Safety Equipment	*You must be able to:* P1. Select personal protective equipment in terms of type and quantity according to work orders. P2. Wear, adjust, and maintain personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures. P3. Ensure personal protective equipment is cleaned and stored in proper place.	*You must know and understand:* K1. Explain Importance of using Personal Protective Equipment. K2. Define Types of PPE. K3. Identify Protective clothing and equipment (PPE) to be worn and where it can be obtained. K4. Explain the Safe maintenance of PPEs.	Safety shoes, Safety gloves, Safety goggles, Safety helmet, face mask
I4. Practice safe work habits to ensure safety at workplace	*You must be able to:* P1. Wear required clothing (not loose or torn), confine long hair, and remove jewelry in accordance with company procedures. P2. Apply work procedures and approaches that ensure personal safety as well as others safety. P3. Demonstrate good housekeeping in the workplace by cleaning up spills or leaks. P4. Keep work area clean and clear of obstructions, and storing tools or equipment, so that the potential for accident or injury is prevented. P5. Ensure tools or equipment are in place and available in proper place as per company procedures.	*You must know and understand:* K1. Explain Importance of safety at work and its implications. K2. Describe Work safety procedures and guidelines. K3. Explain Specific company procedures regarding workplace safety. K4. Explain procedure for cleaning and storing of tools and equipment at workplace.	Fire extinguisher, Tool box/bins, Safety covers, First aid box, Safety equipment

List of Tools, Equipment and Machinery

- Testers
- Scanners
- Sound detectors
- Digital multi-meters
- Analyzers
- Gauges
- Job card/repair order
- Repair manual
- Flat rate time (FRT)
- Estimation forms
- Lifts
- Jacks
- Safety stand
- Spanners set
- Wrenches
- Hammers
- Socket set
- Screw driver
- Plier
- Filter spanner
- Special service tools (SSTs)
- Oil filler gun,
- Oil transfer equipment,
- Funnel
- Seat covers protector,
- Steering wheel cover,
- Hand brake cover,
- Gear lever cover,
- Floor matts,
- Driving license
- Vernier caliper

- Dial indicator gauge
- Wheel spanner
- Bleeding kit
- Bench vice
- Technician stretcher
- Bleeding kit
- Back winding tool
- Amery paper
- Electric Wiring Diagram (EWD)
- Multi-meter,
- Test lamp,
- Cutter plier
- Insulation tape
- Compression gauge,
- Fuel pressure gauge,
- Filler gauge,
- Oil pressure gauge
- Off-car injector simulator
- torque wrench,
- T handles
- Scrappers,
- nose plier
- Plastic hammer
- Thermometer
- Ring Compressor
- compression gauge
- Star Allen Keys
- Oscilloscope
- Lamp tester
- Magnetic stick
- Hydro meter
- Ignition timing gun
- Analyser

- Plug cleaner
- Exhaust gas analyzer,
- Back pressure tester
- Vacuum tester
- Wheel aligner
- wheel balancer
- hammers
- Ball joint opener
- Tire lever
- wheel spanner
- oil gun
- fluid filler gun
- stall speed test gauge
- lock pliers
- Safety shoes
- Safety gloves
- Safety goggles
- Face mask
- Safety helmet
- Fire extinguisher
- Smoke alarm
- First aid box