Kentucky CTE

Transportation Education: Automotive Maintenance and Light Repair Sections A, B, C, & D

Identify general shop safety rules and procedures. AMLR1	**1 Identify general shop safety rules and procedures.** AMLR1
Utilize safe procedures for handling of tools and equipment. AMLR2	**2 Utilize safe procedures for handling of tools and equipment.** AMLR2
Identify and use proper placement of floor jacks and jack stands AMLR3	**3 Identify and use proper placement of floor jacks and jack stands** AMLR3
Identify and use proper procedures for safe lift operation. AMLR4	**4 Identify and use proper procedures for safe lift operation.** AMLR4
Utilize proper ventilation procedures for working within the lab/shop area. AMLR5	**5 Utilize proper ventilation procedures for working within the lab/shop area.** AMLR5
Identify marked safety areas. AMLR6	**6 Identify marked safety areas.** AMLR6
Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of	**7 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.** AMLR7

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and other fire safety equipment. AMLR7	
Identify the location and use of eye wash stations. AMLR8	8 Identify the location and use of eye wash stations. AMLR8
Identify the location of the posted evacuation routes. AMLR9	9 Identify the location of the posted evacuation routes. AMLR9
Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. AMLR10	10 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. AMLR10
Identify and wear appropriate clothing for lab/shop activities. AMLR11	11 Identify and wear appropriate clothing for lab/shop activities. AMLR11
Secure hair and jewelry for lab/shop activities AMLR12	12 Secure hair and jewelry for lab/shop activities AMLR12
Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. AMLR13	13 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. AMLR13
Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). AMLR14	14 Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). AMLR14
Lo kn	Locate and demonstrate knowledge of material safety data sheets (MSDS). AMLR15

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safety data sheets (MSDS). AMLR15		
Identify tools and their usage in automotive applications. AMLR16	16	Identify tools and their usage in automotive applications. AMLR16
Identify standard and metric designation. AMLR17	17	Identify standard and metric designation. AMLR17
Demonstrate safe handling and use of appropriate tools. AMLR18	18	Demonstrate safe handling and use of appropriate tools. AMLR18
Demonstrate proper cleaning, storage, and maintenance of tools and equipment. AMLR19	19	Demonstrate proper cleaning, storage, and maintenance of tools and equipment. AMLR19
Demonstrate proper use of precision measuring tools (for example, micrometer, dialindicator, and dial-caliper). AMLR20	20	Demonstrate proper use of precision measuring tools (for example, micrometer, dialindicator, and dial-caliper). AMLR20
Identify information needed and the service requested on a repair order. AMLR21	21	Identify information needed and the service requested on a repair order. AMLR21
Identify purpose and demonstrate proper use of fender covers, mats. AMLR22	22	Identify purpose and demonstrate proper use of fender covers, mats. AMLR22
Demonstrate use of the three C's (concern, cause, and correction). AMLR23	23	Demonstrate use of the three C's (concern, cause, and correction). AMLR23
Review vehicle service his	24	Review vehicle service history. AMLR24

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Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. AMLR25	**25** **Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.** AMLR25
Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover). AMLR26	**26** **Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover).** AMLR26
ENGINE REPAIR: AMLR27	**a** **Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.** AMLR27A
	b **Verify operation of the instrument panel engine warning indicators.** AMLR27B
	c **Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.** AMLR27C
	d **Install engine covers using gaskets, seals, and sealers as required.** AMLR27D
	e **Remove and replace timing belt; verify correct camshaft timing.** AMLR27E
	f **Perform common fastener and thread repair to include remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.** AMLR27F
	g **Identify hybrid vehicle internal combustion engine service precautions.** AMLR27G
	h **Adjust valves (mechanical or hydraulic lifters).** AMLR27H
	i **Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action.** AMLR27I
	j **Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.** AMLR27J
	k **Remove, inspect, and replace thermostat and gasket/seal.** AMLR27K
	l **Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.** AMLR27L
	Perform engine oil and filter change. AMLR27M

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AUTOMATIC TRANSMISSION AND TRANSAXLE: AMLR28	**a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. AMLR28A
	b Check fluid level in a transmission or a transaxle equipped with a dipstick. AMLR28B
	c Check fluid level in a transmission or a transaxle not equipped with a dipstick. AMLR28C
	d Check transmission fluid condition; check for leaks. AMLR28D
	e Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. AMLR28E
	f Inspect for leakage at external seals, gaskets, and bushings. AMLR28F
	g Inspect power train mounts. AMLR28G
	h Drain and replace fluid and filter(s). AMLR28H
	i Describe the operational characteristics of a continuously variable transmission (CVT). AMLR28I
	j Describe the operational characteristics of a hybrid vehicle drive train. AMLR28J
MANUAL DRIVE TRAIN AND AXLES: AMLR29	**a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. AMLR29A
	b Drain and refill manual transmission/transaxle and final drive unit. AMLR29B
	c Check fluid condition; check for leaks. AMLR29C
	d Check and adjust clutch master cylinder fluid level. AMLR29D
	e Check for system leaks. AMLR29E
	f Describe the operational characteristics of an electronically controlled manual transmission/transaxle. AMLR29F
	g Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. AMLR29G
	h Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. AMLR29H
	i Clean and inspect differential housing; check for leaks; inspect housing vent. AMLR29I
	j Check and adjust differential housing fluid level. AMLR29J
	k Drain and refill differential housing. AMLR29K

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	l Inspect and replace drive axle wheel studs. AMLR29L
	m Inspect front-wheel bearings and locking hubs. AMLR29M
	n Check for leaks at drive assembly seals; check vents; check lube level. AMLR29N
SUSPENSION AND STEERING SYSTEMS: AMLR30	**a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. AMLR30A
	b Disable and enable supplemental restraint system (SRS). AMLR30B
	c Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. AMLR30C
	d Determine proper power steering fluid type; inspect fluid level and condition. AMLR30D
	e Flush, fill, and bleed power steering system. AMLR30E
	f Inspect for power steering fluid leakage; determine necessary action. AMLR30F
	h Inspect and replace power steering hoses and fittings. AMLR30H
	i Replace power steering pump filter(s). AMLR30I
	j Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. AMLR30J
	k Inspect tie rod ends (sockets), tie rod sleeves, and clamps. AMLR30K
	l Inspect upper and lower control arms, bushings, and shafts. AMLR30L
	m Inspect and replace rebound and jounce bumpers. AMLR30M
	n Inspect track bar, strut rods/radius arms, and related mounts and bushings. AMLR30N
	o Inspect upper and lower ball joints (with or without wear indicators). AMLR30O
	p Inspect suspension system coil springs and spring insulators (silencers). AMLR30P
	q Inspect suspension system torsion bars and mounts. AMLR30Q
	r Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links. AMLR30R
	s Inspect strut cartridge or assembly. AMLR30S
	ıspect front strut bearing and mount. AMLR30T

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u Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. AMLR30U

v Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. AMLR30V

w Inspect, remove, and replace shock absorbers; inspect mounts and bushings. AMLR30W

x Inspect electric power-assisted steering. AMLR30X

y Identify hybrid vehicle power steering system electrical circuits and safety precautions. AMLR30Y

z Describe the function of the power steering pressure switch. AMLR30Z

aa Perform pre-alignment inspection and measure vehicle ride height; determine necessary action. AMLR30AA

bb Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action. AMLR30BB

cc Rotate tires according to manufacturer's recommendations. AMLR30CC

dd Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). AMLR30DD

ee Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. AMLR30EE

ff Inspect tire and wheel assembly for air loss; perform necessary action. AMLR30FF

gg Repair tire using internal patch. AMLR30GG

hh Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. AMLR30HH

ii Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. AMLR30II

BRAKES: AMLR31

a Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. AMLR31A

b Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). AMLR31B

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leasure breaks pedal height, travel, and free play (as applicable); determine ecessary action. AMLR31C

d **Check master cylinder for external leaks and proper operation.** AMLR31D

e **Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action.** AMLR31E

f **Select, handle, store, and fill brake fluids to proper level.** AMLR31F

g **Identify components of brake warning light system.** AMLR31G

h **Bleed and/or flush brake system.** AMLR31H

i **Test brake fluid for contamination.** AMLR31I

j **Remove, clean, inspect, and measure brake drum diameter; determine necessary action.** AMLR31J

k **Refinish brake drum and measure final drum diameter; compare with specifications.** AMLR31K

l **Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/selfadjusters, other related brake hardware, and backing support plates; lubricate and reassemble.** AMLR31L

m **Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.** AMLR31M

n **Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.** AMLR31N

o **Install wheel and torque lug nuts.** AMLR31O

p **Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.** AMLR31P

q **Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.** AMLR31Q

r **Remove, inspect, and replace pads and retaining hardware; determine necessary action.** AMLR31R

s **Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.** AMLR31S

t **Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.** AMLR31T

u **Remove and reinstall rotor.** AMLR31U

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efinish rotor on vehicle; measure final rotor thickness and compare with pecifications. AMLR31V

	w Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. AMLR31W
	x Retract and re-adjust caliper piston on an integral parking brake system. AMLR31X
	y Check brake pad wear indicator; determine necessary action. AMLR31Y
	z Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. AMLR31Z
	aa Check brake pedal travel with, and without, engine running to verify proper power booster operation. AMLR31AA
	bb Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster AMLR31BB
	cc Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. AMLR31CC
	dd Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. AMLR31DD
	ee Check parking brake operation and parking brake indicator light system operation; determine necessary action. AMLR31EE
	ff Check operation of brake stop light system. AMLR31FF
	gg Replace wheel bearing and race. AMLR31GG
	hh Identify traction control/vehicle stability control system components. AMLR31HH
	ii Identify traction control/vehicle stability control system components. AMLR31II
ELECTRICAL/ELECTRONIC SYSTEMS: AMLR32	**a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. AMLR32A
	b Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). AMLR32B
	c Use wiring diagrams to trace electrical/electronic circuits. AMLR32C
	d Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. AMLR32D
	e Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. AMLR32E
	f Check operation of electrical circuits with a test light. AMLR32F
	g Check operation of electrical circuits with fused jumper wires. AMLR32G

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h Measure key-off battery drain (parasitic draw). AMLR32H

i Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. AMLR32I

j Perform solder repair of electrical wiring. AMLR32J

k Replace electrical connectors and terminal ends. AMLR32K

l Perform battery state-of-charge test; determine necessary action. AMLR32L

m Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. AMLR32M

n Maintain or restore electronic memory functions. AMLR32N

o Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. AMLR32O

p Perform slow/fast battery charge according to manufacturer's recommendations. AMLR32P

q Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. AMLR32Q

r Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. AMLR32R

s Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery. AMLR32S

t Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. AMLR32T

u Perform starter current draw test; determine necessary action. AMLR32U

v Perform starter circuit voltage drop tests; determine necessary action. AMLR32V

w Inspect and test starter relays and solenoids; determine necessary action. AMLR32W

x Remove and install starter in a vehicle. AMLR32X

y Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. AMLR32Y

z Perform charging system output test; determine necessary action. AMLR32Z

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Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. AMLR32AA

	bb Remove, inspect, and re-install generator (alternator). AMLR32BB
	cc Perform charging circuit voltage drop tests; determine necessary action. AMLR32CC
	dd Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. AMLR32DD
	ee Aim headlights. AMLR32EE
	ff Identify system voltage and safety precautions associated with high-intensity discharge headlights. AMLR32FF
	gg Disable and enable airbag system for vehicle service; verify indicator lamp operation. AMLR32GG
	hh Remove and reinstall door panel. AMLR32HH
	ii Describe the operation of keyless entry/remote-start systems. AMLR32II
	jj Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. AMLR32JJ
	kk Verify windshield wiper and washer operation; replace wiper blades. AMLR32KK
HEATING AND AIR CONDITIONING: AMLR33	**a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. AMLR33A
	b Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. AMLR33B
	c Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. AMLR33C
	d Inspect A/C condenser for airflow restrictions; determine necessary action. AMLR33D
	e Inspect engine cooling and heater systems hoses; perform necessary action. AMLR33E
	f Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. AMLR33F
	g Identify the source of A/C system odors. AMLR33G
ENGINE PERFORMANCE: AMLR34	**a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. AMLR34A

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b Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. AMLR34B

c Perform cylinder power balance test; determine necessary action. AMLR34C

d Perform cylinder cranking and running compression tests; determine necessary action. AMLR34D

e Perform cylinder leakage test; determine necessary action. AMLR34E

f Verify engine operating temperature. AMLR34F

g Remove and replace spark plugs; inspect secondary ignition components for wear and damage. AMLR34G

h Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. AMLR34H

i Describe the importance of operating all OBDII monitors for repair verification. AMLR34I

j Replace fuel filter(s). AMLR34J

k Inspect, service, or replace air filters, filter housings, and intake duct work. AMLR34K

l Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. AMLR34L

m Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. AMLR34M

n Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. AMLR34N

o Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. AMLR34O