



Pathfinder's Name

Automobile Mechanics

1. Properly start an automobile or light truck engine with an automatic transmission, and then one with a standard transmission. Briefly explain why it is necessary for the engine to have the proper oil, water, fuel, and battery pressures and levels for proper engine operation.

2. Briefly describe how a keyless ignition system functions. Properly start an automobile or light truck with a push button start/stop assembly.

3. Briefly explain the following concepts:
a. The principles of four-cycle engine vs. a two-cycle engine.

- b. The difference between a gasoline and a diesel engine.

- c. The major differences between carburetor fuel systems and fuel-injection systems.

d. The principles of an electric vehicle.

❑ 4. What is an ECU? Give three practical examples of its use

1. _____

2. _____

3. _____

❑ 5. Briefly explain the function of the following:

a. Engine:

crankshaft

connecting rods

pistons

camshaft

valves

oil pump

carburetor

fuel injectors

ignition distributor

fuel distributor

electrical system including alternator

battery

regulator

b. Transmission

The difference between standard transmission and automatic transmission

how the engine torque is transmitted to both kinds of transmissions; the purpose of overdrive

c. Drivetrain:

The difference between rear wheel drive

front wheel drive

all-wheel drive

d. Brakes:

The difference between drum brakes and disk brakes

standard brakes and power brakes, and the parking brake

6. Describe two techniques used to measure the tread depth of a tire.

1. _____

2. _____

7. What is a tire pressure gauge? Briefly describe:

a. where to check for the recommended tire pressure

b. the process of adjusting the tire pressure as necessary

c. what takes place when the tire pressure is low

8. How often should the engine oil, transmission oil, and cooling fluid be changed?

9. Give some pointers on proper care of the vehicle and its finish, both interior and exterior.

10. Be able to describe and locate each of the following items, if equipped.
a. Fuel Pump

b. Gaskets

c. Muffler

d. Spark Plugs

e. Timing Belt

f. Water Pump

g. Radiator

h. Catalytic Converter

i. Paddle Shifters

j. Single/Dual Exhaust

k. Cruise Control

l. Suspension (Shocks & Struts)

m. Brake Assist

n. Air Bags

o. Keyless Entry

p.Fuse Box

q.Master Cylinder

- 11.**Perform typical automotive maintenance as listed below:
 - a.**Check engine and transmission oil levels.
 - b.**Check water/antifreeze level. Change and flush the cooling system.
 - c.**Change engine oil and filter.
 - d.**Change a tire, following proper safety procedure.
 - e.**Lubricate the chassis according to the vehicle service manual.
 - f.**Check windshield wipers and replace if necessary.
 - g.**Check windshield wiper fluid reservoir and adjust fluid levels as necessary.
 - h.**Check power steering fluid levels.
 - i.**Check front, rear, and turning signal lights.
 - j.**Check air filter and replace if necessary.
 - k.**Check cabin filter and replace if necessary.

Date completed _____

Automobile Mechanics, Advanced

- 1. Have the Automobile Mechanics Honor
- 2. Briefly explain the following concepts.
 - a. The difference between a supercharger and a turbo

- b. The difference between staggered wheels and non-staggered wheels.

- c. The difference between alternating current (AC) and direct current (DC).

- d. The difference between horsepower and torque

- 3. Describe how an anti-lock braking system (ABS) operates.

- 4. Briefly explain how to do each of the following:
 - a. Read the manufacture date on a tire.

- b. Determine the tire size and pressure as recommended by the manufacturer for a selected vehicle.

c. Measure tire wear and determine the remaining life of a tire.

5. Describe how a rear axle differential functions.

6. Briefly explain the differences between the following types of brake rotors:

a. Smooth brake rotors

b. Slotted brake rotors

c. Cross-drilled brake rotors

d. Cross-drilled & slotted brake rotors

7. Briefly explain the difference between a wheel alignment and tire balancing.

8. Briefly describe the following types of engines:

a. Straight

b. V-engine

c. W-engine

d. Rotary engine

e. Boxer engine

- 9.** Know how to replace the brake assembly at the wheel, following proper safety procedures. Demonstrate proper brake bleeding and adjustment.

Date completed _____

- 10.** Perform a minor tune-up, including the replacement of spark plugs and visually checking the electrical system.

Date completed _____