

# COOLING SYSTEM PRESSURE TEST

PERFORM THE FOLLOWING STEPS ON AN AUTOMOBILE:

**STEPS:**

1. GET A COOLING SYSTEM PRESSURE TESTER.
2. AFTER CHECKING THAT THE COOLING SYSTEM IS SAFE TO OPEN, REMOVE RADIATOR CAP.
3. THE RADIATOR SHOULD BE FULL OF COOLANT.
4. ATTACH THE TESTER TO THE RADIATOR FILLER NECK.
5. PUMP UP THE PRESSURE IN THE COOLING SYSTEM UNTIL IT IS THE SAME AS THE PRESSURE SPECIFIED ON THE RADIATOR CAP.
6. WATCH THE GAUGE TO SEE IF THE PRESSURE HOLDS STEADY.
7. IF THE PRESSURE DOES NOT HOLD, LOOK FOR LEAKS.
8. IF THE PRESSURE HOLDS FOR ONE MINUTE OR MORE THE SYSTEM IS GOOD.
9. REMOVE TESTER.
10. INSTALL THE RADIATOR CAP ADAPTER ON TO THE TESTER.
11. ATTACH THE RADIATOR CAP TO THE OTHER END OF THE ADAPTER.
12. PUMP UP THE TESTER.
13. THIS TIME THE PRESSURE SHOULD RELEASE AT THE PRESSURE SPECIFIED ON THE RADIATOR CAP. IF NOT, THE CAP IS BAD.
14. RELEASE PRESSURE AND REMOVE THE CAP.
15. INSTALL THE CAP BACK ON THE RADIATOR.

ANSWER THE QUESTIONS ON THE BACK:

ANSWER THE FOLLOWING:

1. What is the purpose of a cooling system pressure test?
2. How do you check to see if a radiator cap is safe to remove?
3. Where do you find the pressure setting which the cooling system is tested at?
4. Why does the radiator cap need to hold pressure in the cooling system?
5. Name two possible causes of a failed cooling system pressure test?

2

## CHECK BRAKES (FRONT AND REAR)

After checking front and rear brakes, answer the following questions:

1. What is the correct name for the disk on disk brakes?
  2. Disk brakes use \_\_\_\_\_, drum brakes use \_\_\_\_\_.
  3. Name the two main things that you look for when checking brakes?
  4. If you hear noise when applying the brakes on a car, what is the first step you should take?
  5. Which have more stopping power, drum or disk brakes?
  6. How often should you check a cars brakes?
  7. All modern automobiles have \_\_\_\_\_ brakes.
  8. Explain what is done when a basic brake job is performed?
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Instructors signature \_\_\_\_\_

# PARTS LOCATION

3

**A:** Locate the following parts listed below on a car or truck.

**B:** Write down its location and briefly explain what the part does.

1. Alternator.
2. Power steering pump.
3. Valve cover.
4. Ignition distributor.
5. Ignition coil or coils.
6. Thermostat housing.
7. Starter motor and solenoid.
8. Oxygen sensor.
9. Diagnostic connector.
10. CV joint axle boots.
11. Fuel injectors
12. Throttle position sensor.
13. Fuse box or power distribution box
14. Intake manifold.
15. Exhaust manifold.

# COMPRESSION TEST

1. SELECT AN AUTOMOBILE TO TEST.
2. GET THE REQUIRED TOOLS. (*COMPRESSION TESTER, RATCHET AND SPARKPLUG SOCKET, EXTENSIONS*).
3. DISCONNECT THE ENGINES SPARKPLUG WIRES. (*NUMBER THEM IF NEEDED*)
4. REMOVE ALL OF THE SPARKPLUGS.
5. SELECT THE CORRECT HOSE AND INSTALL THE COMPRESSION TESTER IN A CYLINDER SPARKPLUG HOLE.
6. WITH A REMOTE STARTER OR A HELPER, CRANK THE ENGINE OVER.
7. THE ENGINE SHOULD CRANK OVER FOR 6 TO 7 COMPRESSION STROKES. (*LISTEN TO ENGINE*)
8. RECORD YOUR READING THEN MOVE TO THE NEXT CYLINDER.
9. WHEN FINISHED REINSTALL PLUGS AND WIRES.
10. START ENGINE.

RECORD READINGS HERE.

FRONT OF ENGINE


ANSWER THE FOLLOWING:

1. What is the purpose of a compression test?
2. What is considered good compression?
3. Why must all the sparkplugs be removed?
4. If an engine has low compression, what could be the problem?
5. How would an engine run with low compression in one cylinder?

CAR USED: \_\_\_\_\_

# VEHICLE SPECIFICATIONS

Find the following information in a repair manual or the Ondemand system.

PLUG GAP: \_\_\_\_\_

IGNITION TIMING: \_\_\_\_\_

IDLE SPEED: \_\_\_\_\_

COMPRESSION RATIO / PRESSURE: \_\_\_\_\_

FUEL PRESSURE: \_\_\_\_\_

CYLINDER HEAD TORQUE: \_\_\_\_\_

TIMING CHAIN REMOVE AND INSTALL: list first two steps.

BRAKE PAD REMOVE AND INSTALL: list first two steps.

# BALANCE A TIRE AND WHEEL

STEP:

NAME \_\_\_\_\_

1. REMOVE TIRE AND WHEEL FROM CAR OR USE SHOP DEMO. WHEEL.
2. REMOVE OLD WEIGHTS FROM THE WHEEL.
3. MOUNT WHEEL ON THE BALANCER. BE SURE THE CONE FITS THE CENTER HOLE AND THAT THE WHEEL SPINS TRUE AFTER MOUNTING. DO NOT OVER TIGHTEN CRANK NUT.
4. SET THE THREE DIALS ON THE BALANCER TO THE PROPER SETTINGS. LOOK AT THE PICTURE NEXT TO THE DIAL TO DETERMINE WHAT MEASUREMENT IS TO BE USED. YOU WILL MEASURE THE WIDTH USING THE GIANT CALIPERS. THE DIAMETER IS ON THE SIDEWALL OF THE TIRE. THE DISTANCE TO THE INSIDE OF THE WHEEL IS MEASURED WITH THE RULER THAT SLIDES OUT OF THE BALANCER.
5. SPIN THE WHEEL IN A CLOCKWISE DIRECTION UNTIL THE BALANCER BEEPS.
6. AFTER WHEEL STOPS, TURN WHEEL UNTIL TWO LIGHTS ON THE SAME SIDE ARE LIT AND DISPLAY READS OUT.
7. WHILE OUTSIDE LIGHTS ARE LIT, ATTACH WEIGHTS TO THE OUTSIDE OF THE WHEEL AT THE VERY TOP. DO THE SAME FOR THE INSIDE.
8. SPIN THE WHEEL ONE MORE TIME. IF THE WHEEL IS BALANCED CORRECTLY THE DISPLAY SHOULD READ 000. IF NOT, START OVER.

## ANSWER THE FOLLOWING:

1. NAME THE TWO TYPES OF WHEEL BALANCING.
2. WHAT TYPE OF TREAD WEAR ON A TIRE WOULD SHOW A WHEEL BALANCE PROBLEM?
3. IF YOU PUT 2.5 OZ. ON A WHEEL AND THEN PUT 3.0 OZ. ON THE WHEEL EXACTLY OPPOSITE, HOW MUCH WEIGHT WILL A BALANCER SHOW YOU ADDED?
4. DID YOUR WHEEL BALANCE OUT THE FIRST TIME (IT'S OK IF IT DID NOT)?

# HOIST / LIFT

1. What must you always do, when driving a car on one of the hoists?
2. What do you do, when the car is just inches off the floor on the in ground hoist? AND WHY.
3. What safety devices do our hoists have?

In ground \_\_\_\_\_

Above ground \_\_\_\_\_

4. You use the forks on the rear post to lift a front wheel drive car.

True ---- False

5. Why do we rock the car on the above ground lift, before we lift it in the air?
6. What part of the car does the in ground hoist lift from?
7. How do we find the lift points for a car on the above ground lift?
8. Before driving a car off of one of the hoists, what must you be sure you do?

## CHECK FLUID LEVELS

8

CHECK THE LEVEL OF EACH OF THE FOLLOWING ITEMS ON AN AUTOMOBILE.

WRITE YOUR READINGS AFTER EACH ITEM.

1. ENGINE OIL.
2. MANUAL /AUTOMATIC TRANSMISSION FLUID.  
(*engine must be running for automatic trans.*)
3. BRAKE FLUID.
4. POWERSTEERING FLUID. (*if it has it*)
5. ENGINE COOLANT. (*check reservoir also*)
6. BATTERY WATER. (*if caps are removable*)
7. WINDSHIELD WASHER FLUID. (*if used*)
8. REAR DIFFERENTIAL FLUID. (*unless frontwheel drive*)

ANSWER EACH OF THE FOLLOWING:

1. On a engine oil dip stick, the distance from the full mark to the mark before it measures \_\_\_\_\_?
2. How do you check the differential fluid on a frontwheel drive car?
3. Do you always remove the radiator cap to check the coolant level?
4. How full should a master cylinder be filled with brake fluid?
5. How do you know what type of oil to put in a cars engine?

INSTRUCTORS APPROVAL \_\_\_\_\_



9

## Remove and Install Caliper and Rotor

Answer the following:

1. What is the name of the part that holds the brake pads?
2. On most cars, how is the outer brake pad pushed against the rotor?
3. How is the inner pad pushed against the rotor?
4. What parts did you remove to take the rotor off the car you worked on?
5. How do you remove the front rotors from most rear wheel drive cars?
6. How are disk brakes adjusted?
7. What is one thing you must never do when brakes are disassembled?
8. What is the final step after brakes are assembled?
9. What must be done when brake pads are replaced?
10. What can cause brake noise, even when the pads are good?

## BATTERY SERVICE

### COMPLETE THE FOLLOWING STEPS ON AN AUTOMOBILE

1. Disconnect the battery and clean the battery cables and battery terminals. Remember to disconnect the negative cable first.
2. Check the water in the battery if possible. Don't pry off the caps if they are glued on.
3. Check the hold down to be sure the battery is anchored in the car properly.
4. After finishing steps one and two and three connect the battery charger to the battery and start the charger. After connected, show your instructor.

### ANSWER THE FOLLOWING QUESTIONS:

1. What is the technical name for the water in a battery?
2. How full should a battery be filled with water?
3. What is the purpose of the safety device on our battery charger?
4. What substance is commonly used to clean batteries?
5. Which battery cable do you connect last?
6. What is a hydrometer?
7. What does cold cranking amps mean?
8. What can you do to prevent battery corrosion?

INSTRUCTORS APPROVAL \_\_\_\_\_

# VEHICLE INSPECTION

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CAREFULLY INSPECT THE CONDITION OR OPERATION OF EACH OF THE FOLLOWING ITEMS ON AN AUTOMOBILE. WRITE YOUR FINDINGS AFTER EACH ITEM. GOOD, FAIR, OR POOR. (DESCRIBE PROBLEMS)

## GENERAL SAFETY:

1. WINDOW GLASS.
2. MIRRORS.
3. WINDSHIELD WIPER OPERATION AND BLADES.
4. EMERGENCY BRAKE ADJUSTMENT AND OPERATION.
5. BRAKE PEDAL TRAVEL.
6. CLUTCH PEDAL TRAVEL.
7. TURN SIGNALS.
8. EMERGENCY FLASHER.
9. LICENSE PLATE LIGHT.
10. PARKING LIGHTS
11. BRAKE LIGHTS.
12. BACKUP LIGHTS.

13. HEADLIGHTS.

14. TAIL LIGHTS.

**UNDER HOOD:**

15. COOLANT/WATER LEAKS.

16. COOLANT CONDITION.

17. ALL DRIVE BELTS CONDITION AND ADJUSTMENT.

18. BATTERY HOLD-DOWN.

19. BATTERY CABLES.

20. ENGINE OIL LEAKS.

21. AIR FILTER.

22. FUEL FILTER. (JUST FIND AND WRITE DOWN LOCATION):

23. RADIATOR HOSES.

24. HEATER HOSES.

25. POWER STEERING HOSES.

26. SPARKPLUG WIRES

**UNDER VEHICLE:**

27. LUBRICATION POINTS.

28. TIRE PRESSURE.

29. NAILS IN TIRES.

30. TIRE WEAR AND TREAD DEPTH.

31. SHOCK ABSORBERS - VISUAL CHECK

32. SHOCK ABSORBERS - FUNCTIONAL CHECK

33. BRAKE HOSES AND SYSTEM LEAKS.

34. UNIVERSAL JOINTS / CV JOINT BOOTS.

35. TRANSMISSION LEAKS.

36. DIFFERENTIAL / TRANSAXLE LEAKS:

37. ENGINE OIL LEAKS.

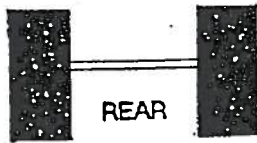
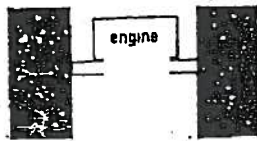
38. EXHAUST SYSTEM. (RUST, RATTLES, HOLES, ETC.....)

39. FUEL LINE LEAKS.

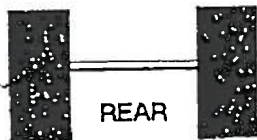
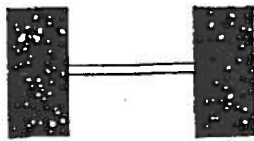
40. BODY RUST OR ROT.

# TIRE ROTATION

1. Explain why you need to rotate the tires on a car.
2. What four things are important to maintain good tire wear?
3. At what point of tread wear is a tire considered illegal?
4. What is a good basic rule when deciding which tire should go where?
5. Draw a standard rotation pattern for the tires in the picture below.



6. Draw the pattern you used for the car you did?



13

# CAR IDENTIFICATION

YEAR \_\_\_\_\_

MAKE \_\_\_\_\_

MODEL \_\_\_\_\_

BODY STYLE \_\_\_\_\_

ENGINE SIZE \_\_\_\_\_

ENGINE CONFIGURATION \_\_\_\_\_

DRIVETRAIN TYPE \_\_\_\_\_

FUEL SYSTEM TYPE \_\_\_\_\_

BODY CONSTRUCTION \_\_\_\_\_

ENGINE MOUNTING \_\_\_\_\_

SUSPENSION TYPE \_\_\_\_\_

# TORQUE LUG NUTS

14

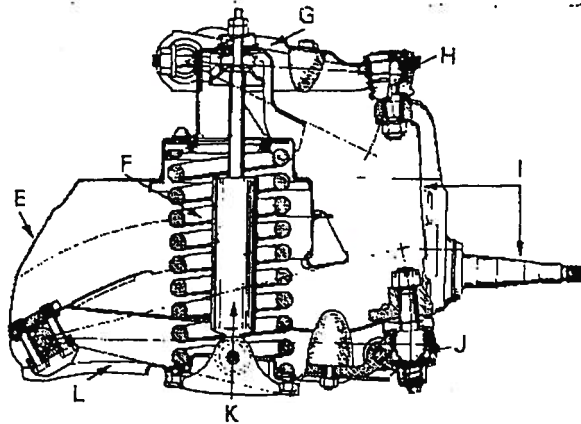
1. Define the term torque:
2. What unit of measurement is used to measure torque?
3. Explain exactly what the answer to question 2 is.
4. What precautions should you take when installing lug nuts?
5. What type of pattern do you follow when tightening lug nuts?
6. What is the torque setting of most car lug nuts?
7. What problems could be created by improper lug nut torque or tightening?

# CHASSIS LUBE

15

Answer the following:

1. Do all vehicles need to have the chassis lubricated? Why.
2. What do we call the chassis part that the grease gun attaches to?
3. What are the chassis systems that you usually lubricate?
4. What type of steering are most cars using today?
5. What part of the drivetrain may need lubrication?
6. Fill in the blanks below.



- E. \_\_\_\_\_
- F. \_\_\_\_\_
- G. \_\_\_\_\_
- H. \_\_\_\_\_
- I. \_\_\_\_\_
- J. \_\_\_\_\_
- K. \_\_\_\_\_
- L. \_\_\_\_\_



## FLOOR JACK AND JACK STANDS

SET A VEHICLE UP ON JACK STANDS AS IF YOU WERE GOING UNDER IT TO WORK ON THE CAR.

HAVE YOUR INSTRUCTOR INSPECT THE VEHICLE WHEN IT IS READY.

Answer the following:

1. What part of the vehicle is the floor jack placed on?
2. Where should you never place the jack stands?
3. Can jack stands be placed on a solid axle, like the rear of most pickups.
4. Name two common parts of a vehicle that are damaged by improper placement of a floor jack?
5. If you want to remove the left rear tire from a vehicle, where should you be in position to the vehicle when lifting it?

17

## IGNITION TIMING

name \_\_\_\_\_

After setting the ignition timing on an engine, answer the following questions:

1. What car did you set the timing on?
2. Which sparkplug wire does the timing light attach to?
3. What is the timing specification for the engine you used?
4. What was the timing set at when you checked it?
5. Where are the timing marks located on your engine?
6. How do you change the timing on your engine?
7. What does BTDC stand for?
8. Where can you find information about setting the timing?
9. What does DIS stand for?
10. Define the term ignition timing.

# GAP A SPARK PLUG

18

1. What tool is used to gap a spark plug?
2. Write the setting that you gapped your plug to in the blank below.  
\_\_\_\_\_
3. What color should a spark plug be when removed from an engine?
4. Name two places you can find the plug gap specification for an engine.
5. Use the chapter on ignition systems in the automotive fundamentals text to fill in the blanks below.

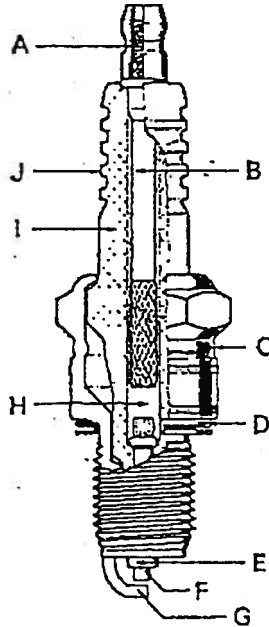


Fig. 3-10

- |    |    |
|----|----|
| A. | F. |
| B. | G. |
| C. | H. |
| D. | I. |
| E. | J. |

## SERPENTINE BELT R&I

19

1. Name the two types of belt systems used on cars and trucks today.
2. What is the purpose of an engines drive belts?
3. What do you look for when inspecting a drive belt?
4. How is a belt adjusted, if it doesn't have an automatic adjuster?
5. What type of belt system uses an automatic adjuster?
6. What is the advantage to the answer of question # 5
7. What is the part called that does the automatic adjusting?
8. Where can you usually find the belt routing diagram?
9. What are the parts called that the belt wraps around?
10. What car did you R and I the belt on.

# TIRE MACHINE

20

Dismount and mount a tire using the tire machine.  
Answer the following questions.

1. What type of tire machine did you use to mount your tire?
2. What is the area of a tire that seals to the wheel called?
3. What is the pressure that should NEVER be exceeded when seating a tire?
4. What does R.I.M. stand for?
5. What is the first step when dismounting a tire?
6. What would cause a tire to wear on one side only?
7. What would cause a tire to wear down the middle of the tread only?
8. After mounting a tire, the tire always needs to be \_\_\_\_\_.
9. Identify what the following numbers mean on a tire.

P     235/70     R     16  
1                    2                    3                    4                    5

- 1.
- 2.
- 3.
- 4.
- 5.