Spring Tune-Up Worksheet (version 5) Date _____
Car _____Year _____Engine # _____Carb(s) _____ Distributor_____

1. Battery Condition (Tool Used - Multi-meter or Battery Analyzer)
Ignition off.
Measure the voltage between (+) and (-) of battery _____ Vdc (>12.5 Vdc).
Or
Connect battery analyzer between (+) and (-) of battery and verify one of the following.
_____ charge & retest, _____ replace, _____ good, _____ Vdc, _____ CCA (cold cranking amps)

Note: If voltage reading is <12.5Vdc, the battery is not at its proper capacity. Charge the battery & retest. Ensure charging system is functional (see 2. below) and all connections to battery posts and frame are clean and tight.

2. Charging System Condition (Tool Used - Multi-meter)
Car running.
Measure the voltage between (+) and (-) of battery _____ Vdc (13.7 to 14.7).

Note: <13.7vdc, Charging system is weak or faulty. Verify all connections to battery posts and frame are clean and tight.

3. Brake & Clutch Fluid Condition - Water content in brake fluid (Tool Used – Brake Fluid Tester)
Ignition off.
Visualy inspect the brake master cylinder and the brake fluid for:
_____ no leaks. Brake fluid is: _____ clear & sediment free to bottom of brake master cylinder.

Place brake fluid tester probe into the brake fluid of master cylinder and record reading.
_____ < 1% _____ 1.5% to 2.5% _____ >3%
Place brake fluid tester probe into the brake fluid of clutch master cylinder and record reading.
_____ < 1% _____ 1.5% to 2.5% _____ >3%

Note: If water content >3% flush the system with new brake fluid. If sediment is found or the fluid is discolored, consider replacing or rebuilding the master cylinder.

4. Cooling System Condition (Tool Used – pressure gauge/pump)
Ignition Off.
Remove radiator cap slowly with rag if hot/warm. Attach the pressure gauge to the radiator. Pressurize system to value of the radiator cap. (7 to 15lbs). Leave pressurized for 5 minutes.
Pressure remains constant. Yes/No _____
Any visible leaks from rad, water pump, hoses, head gasket, head. Yes/No _____

Note: Cooling system pressure drop means a leak, check for leaks in rad, water pump, hoses, head gasket, head.

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5a. Tire Condition - Pressure & Tread Depth (Tools Used - tire pressure gauge, tread depth gauge)
Ignition Off.
Front Right pressure _____ lbs. Tread depth Inside_____ middle_____ outside_____
Front Left pressure _____ lbs. Tread depth Inside_____ middle_____ outside_____
Rear Right pressure _____ lbs. Tread depth Inside_____ middle_____ outside_____
Rear Left pressure _____ lbs. Tread depth Inside_____ middle_____ outside_____

Note: Rear tire pressure is typically 2lbs higher to promote under-steer. The minimum tread depth should be >1/8". Tread depth greater in the middle means tire is under inflated. Tread depth less in the middle means the tire is over inflated. If tread depth is less on the inside or outside of a front tire then verify toe-in is 1/16" to 3/32". Otherwise, suspension components should be checked for wear.

5b. Tire Condition - Age & Size (Tool Used - visual)
Ignition Off.
DOM _____ Tire Size _____

Note: Tire DOM (Date of Manufacture) is a 4 digit code (1st 2 digits are the week of manufacture and last 2 digits are the year of manufacture). If tire has 3 digit code then the tire was manufactured before 2000. Tires > 7 to 10 years old should be replaced regardless of tread depth.

6. Suspension - Front Coil & Rear Leaf Spring Condition (Tool Used - Tape Measure)
Ignition Off.
With car on level ground measure from bottom of chrome strip to center of wheel hub.
Front Right _____ in.
Front Left _____ in.
Rear Right _____ in.
Rear Left _____ in.

Note: >1/2" height difference between front L&R or rear L&R heights or >1" difference front to rear probably indicates weak springs.

7. Suspension - Shock Absorbers/Dampers Condition (Tool Used - Visual)
Ignition Off.
Leaning on the fender close to the bumper apply one good push straight down.
Front Right ____ No bouncing (Straight down, straight back up.) ____ Bouncing
Front Left ____ No bouncing (Straight down, straight back up.) ____ Bouncing
Rear Right ____ No bouncing (Straight down, straight back up.) ____ Bouncing
Rear Left ____ No bouncing (Straight down, straight back up.) ____ Bouncing

Note: Any bouncing indicates faulty shock/damper.

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8. Ignition - Dwell/Points Gap **25D/45D points distributor only** (Tool Used - dwell meter)
Car Running.
Attach dwell meter (+) lead to coil (-) and dwell meter (-) to ground/chassis.
dwell _____ degrees (57 to 63)

Note: Verifies accuracy of .015" points gap

9a. Ignition - Coil (Tools Used - Multi-meter)
Ignition off. Remove HT lead from coil.
Voltage reading between + terminal of coil and ground when **key in start position** _____Vdc
Voltage reading between + terminal of coil and ground when **key in run position** _____Vdc
Ignition Off. Remove connection(s) from either + or - of coil
Resistance between + and – of coil _____ohms

Note: Always 12vdc in start position. Expect 12vdc also in run position with 3 ohm coil and 9vdc approx. with a 1.5 ohm coil.

9b. Ignition - Spark Plug Wire Condition (Tools Used - Multi-meter)
Ignition Off.
Resistance reading of center conductor end to end.
cylinder #1 _____ ohms
cylinder #2 _____ ohms
cylinder #3 _____ ohms
cylinder #4 _____ ohms
coil wire _____ ohms

Note: The lower the resistance the greater the voltage to the spark plug. < 5000 ohms acceptable, best around 1000 ohms approx. per wire and within 10% of each other.

9c. Ignition - Spark Plug Condition (Tools Used – spark plug gap gauge)
Ignition Off.
Measure the spark plug gap and record the general color of the spark plug.
Brand _____ Number_____
cylinder #1 gap _____ colour, tan/chocolate _____ white _____ black _____ oily _____
cylinder #2 gap _____ colour, tan/chocolate _____ white _____ black _____ oily _____
cylinder #3 gap _____ colour, tan/chocolate _____ white _____ black _____ oily _____
cylinder #4 gap _____ colour, tan/chocolate _____ white _____ black _____ oily _____

Note: .025" spark plug gap for OEM ignition, .030" to .040" for electronic ignition. Spark plug color can indicate the general fuel mixture, tan/chocolate color is about right with white indicating the mixture is too lean, black indicating the mixture is too rich, oily indicating oil is entering the combustion chamber and probably indicates a faulty PCV system, or worn rings and/or valve seals.

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10. Engine Valve Clearance Check and Adjustment (Tools Used - feeler gauge, screw driver, wrench)
Ignition Off.
Remove valve cover to record initial valve clearances and set clearances to .013" engine hot or .015" engine cold.

valve #1 initial _____ set _____	valve #5 initial _____ set _____
valve #2 initial _____ set _____	valve #6 initial _____ set _____
valve #3 initial _____ set _____	valve #7 initial _____ set _____
valve #4 initial _____ set _____	valve #8 initial _____ set _____

Note: Decreasing valve clearances with time is usually valve seat recession.

11. Engine Condition - Compression Check (Tool Used - compression gauge)
Ignition Off.
Replace valve cover, remove HT coil lead from coil, all spark plugs, install gauge, hold gas pedal to floor and crank engine until needle of gauge no longer increases (< 10 sec).
cylinder #1 _____ psi
cylinder #2 _____ psi
cylinder #3 _____ psi
cylinder #4 _____ psi

Note: Highest and lowest readings should be within 10% with low compression engines expect around 130 psi and high compression engines around 160 psi.

12a. Distributor Vacuum Advance Operation (Tool Used - vacuum pump & gauge)
Ignition off.
Connect vacuum pump to the vacuum advance module of the distributor and evacuate between 5" to 10" of vacuum.
1. Does the module hold a vacuum when 5" to 10" Hg applied? Yes/No _____
2. Does the module linkage move freely when varying vacuum from 0" to 10" Hg? Yes/No _____

Note: If vacuum advance unit will not hold a vacuum, this is now a vacuum leak that affects your fuel mixture. Plug the vacuum advance hose until vacuum advance unit can be replaced. If linkage does not move with vacuum then repair or replace the vacuum advance unit.

12b. Distributor Mechanical Advance Operation (Tool Used - timing light with tachometer)
Disconnect & plug vacuum line at the distributor. Start car.
Car Running.
1. Record the amount of advance at idle. _____ degrees @ _____ RPM
2. Record the amount of advance at 2000 RPM. _____ degrees
3. Record the max. advance and the RPM at which it occurs. _____ degrees @ _____ RPM

Note: Generally, set maximum advance to 32 degrees. Then the advance at idle is the set point to ensure 32 degrees maximum advance. Centrifugal advance should stop advancing around 3000, if under 3000 rpm the distributor springs have stretched. Expect 10 degrees more than idle at 2000 rpm.

12c. Ignition - Stability (Tool Used - dial back timing light)
Re-attach vacuum line to distributor, add a mark (tape/paint) to crankshaft pulley 180 degrees from the timing mark. Connect timing light. Start car.
Car Running.
Each cylinder is now viewable with 1 & 4 using the existing timing mark and cylinders 2 & 3 with tape/paint mark.
Record the amount of variation (flutter/bounce) of the timing mark for each cylinder.
cylinder #1 _____ < 1 degree _____ 2 to 3 degree _____ > 4 degrees
cylinder #2 _____ < 1 degree _____ 2 to 3 degree _____ > 4 degrees
cylinder #3 _____ < 1 degree _____ 2 to 3 degree _____ > 4 degrees
cylinder #4 _____ < 1 degree _____ 2 to 3 degree _____ > 4 degrees

Note: consistent high variation across all cylinders is usually related to excess distributor shaft wear.

13a. Carbs (HS4/HIF4) Fuel Volume Balance - Jet Depth (Tool Used - vernier calipers)
Ignition off. Remove air cleaners, dash pot, spring & piston.
Measure the depth from the bridge to the top of the jet on front carb _____ in. Reassemble carb.
Measure the depth from the bridge to the top of the jet on rear carb _____ in. Reassemble carb.

Note: Each jet depth should be the same and typically .065" +/- .010". If different depths, split the difference between the 2 (i.e., 1 jet depth up & the other down to make them the same depth). The depth measurement assumes that both carb floats are set to spec.

13b. Carbs (HS4/HIF4) - Air Flow Balance (Tools Used - Unisyn (flow meter))
Car Running.
Use the air flow meter (Unisyn) to verify the reading through each carb is the same at:
1. Idle Yes/No _____
2. 2000 RPM (aprox.) Yes/No _____
Carb dampers/pistons move in tandem with varying engine RPM's. Yes/No _____

Note: No to any of above may require adjustment to the carb linkage to obtain a balanced airflow.

13c. Carbs - Idle Mixture Check (Tools Used - AFR meter)
Car Running. Install air cleaners, mount AFR sensor to tailpipe, seal with rags, power the meter from lighter.
AFR (Air Fuel Ratio) at idle _____

Note: AFR @ idle is typically best at 12.5:1

14. Evaluation of Results and Action Items
1. Evaluate above results and retest as necessary to confirm results/readings.
2. Identify any corrective action needed.
3. Perform corrective action.

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Notes: