Boost & N2O Questions

Theory

Using the information located in i:\wellwood\mechanics\boostn2o.html, the internet, and other resources to answer the following questions.

There are no partial marks – when it says "Describe" – DESCRIBE.

Nitrous Oxide

- 1. When was Nitrous Oxide "discovered?"
- 2. What is the chemical make up of Nitrous Oxide?
- 3. Nitrous is flammable. True or false?
- 4. What is the tank pressure of a full nitrous bottle?
- 5. How does reducing the temperature of a nitrous bottle benefit us, and why?

6. How are nitrous supply lines different than other fuel lines?

7. What is the purpose of the Solenoid?

- 8. Describe using your own words TWO different types of jets used in nitrous systems
 - a.

b.

- 9. A proper nitrous system should have two switches. What are they? a.
 - b.
- 10. Ideally, when should nitrous be applied?

- 11. Describe using your own words what must be required in the following systems in order to run Nitrous Oxide:
 - a. Engine:

b. Fuel:

c. Ignition:

d. Timing:

e. Spark Plugs:

f. Cooling:

Superchargers

12. List three modern cars from that are supercharged by the factory: a.

b.

c.

Name and describe using your own words, these three different types of superchargers, their main advantage and their main disadvantage

13. _____:

a. Advantage:

b. Disadvantage:



- 14. _____:
 - a. Advantage:
 - b. Disadvantage:





a. Advantage:



b. Disadvantage:

- 16. Pick the engine YOU have in YOUR vehicle right now. Using Turbo Tech 103 (Expert).pdf, perform all the calculations (STEP-BY-STEP) required to correctly size a turbocharger.
 - a. RECORD SOME DATA FIRST:
 - i. Engine displacement:
 - ii. Existing power:
 - iii. Desired power:
 - iv. Redline RPM:
 - v. Peak Torque RPM:

b. ESTIMATE:

- i. Volumetric Efficiency (depends on your engine):
- ii. Intake Manifold Temperature (you will need to decide between intercooled versus non-intercooled):
- iii. BSFC: **USE 0.55**
- iv. Air/Fuel Ratio: USE 12

- c. CALCULATE AT REDLINE (SHOW ALL WORK):
 - i. Air Flow:

ii. Manifold Pressure:

iii. Compressor Discharge Pressure (assume a 2psi loss):

iv. Compressor Inlet Pressure:

v. Pressure Ratio:

- d. CALCULATE AT PEAK TORQUE RPM:
 - i. Air Flow:

e. PLOT

- i. <u>FIND</u> an appropriate compressor map at http://www.rbracing-rsr.com/turbotech.html You may use another web site if you find a better one (tell me about it, so I can include the link on the next printing)
- ii. **<u>PRINT</u>** the map out
- iii. **<u>PLOT</u>** your two Air Flow rates at your Pressure Ratio
- iv. ATTACH to this Booklet for marks DON'T SKIP THIS STEP
- v. <u>ATTACH</u> an ad from a retailer that sells THAT turbo <u>DON'T</u> <u>SKIP THIS STEP EITHER</u>
- 17. A boosted engine needs more fuel, because more air means more fuel is required. There are a number of ways you can increase the amount of fuel delivered to your engine. List four of them:
 - a.

b.

c.

d.

18. Higher cylinder pressures in a boosted or nitrous'd engine means more difficult environment for spark. Describe using your own words three ways to get a hotter (higher temperature or higher voltage) spark in your engine:

a.

b. c. d.

Turbochargers:

19. List and Describe the purpose of the three fundamental parts of a turbocharger:

a.

b.

c.

20. Describe using your own words the purpose of the following components:a. Waste Gate:

b. Blow Off Valve:

c. By-Pass Valve:

d. Intercooler:

- e. Water Injection:
- 21. What are the calculations to properly size an intercooler? (Google this)