

Automotive Electrical and Engine Performance 9th Edition
Chapter 20 – Fuel Trim Diagnosis
Quiz B

1. What is the purpose of the PCM's use of the oxygen sensor in closed-loop operation?
 - a. To calculate the base injector pulse width
 - b. To adjust the air-fuel mixture to 14.7:1 using feedback
 - c. To maintain a lambda value of 1.15
 - d. To control the throttle position sensor

2. How is the equivalence ratio related to lambda?
 - a. It is the square of lambda.
 - b. It equals lambda minus 1.
 - c. It is the inverse of lambda.
 - d. It is equivalent to lambda at stoichiometric conditions.

3. What factors contribute to the base pulse width calculation by the PCM?
 - a. RPM, MAP/MAF, BARO, and TPS
 - b. O2 sensor data and throttle position
 - c. Equivalence ratio and lambda feedback
 - d. None of the above

4. Which of the following impacts MAF sensor accuracy?
 - a. Oxygen content in the atmosphere
 - b. Turbulence in the air intake system
 - c. Volumetric efficiency of the engine
 - d. Throttle position rate of change

5. What is the primary purpose of fuel trim adjustments?
- a. Increase injector pulse width under low load
 - b. Maintain long-term data logging
 - c. Optimize catalytic converter efficiency
 - d. Prevent fuel injector damage
6. What is a typical injector pulse width for an idle speed in a 4-liter engine?
- a. 1 ms
 - b. 3 ms
 - c. 4 ms
 - d. 6 ms
7. What happens to fuel trim during a large vacuum leak?
- a. Positive short-term fuel trim increases to compensate.
 - b. Long-term fuel trim immediately adjusts.
 - c. MAF sensor measurements stabilize airflow.
 - d. Engine load decreases.
8. What is the significance of a lambda value of 1.05?
- a. The air-fuel mixture is rich by 5%.
 - b. The air-fuel mixture is lean by 5%.
 - c. It represents stoichiometric conditions.
 - d. It indicates an equivalence ratio of 0.95.
9. How do short-term and long-term fuel trims differ?
- a. STFT is slower but more precise, while LTFT adjusts quickly.
 - b. LTFT represents temporary conditions, while STFT averages over time.
 - c. STFT handles quick adjustments, while LTFT adjusts for prolonged trends.
 - d. LTFT is controlled by the TPS, while STFT is controlled by the MAF.

10. What is a likely cause of negative fuel trim on one bank of a V8 engine?

- a. A restricted catalytic converter on the same bank
- b. Low battery voltage causing injector lag
- c. A contaminated oxygen sensor on the opposite bank
- d. An improperly functioning MAP sensor

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Correct Answers:

1. b

2. c

3. a

4. b

5. d

6. c

7. a

8. d

9. b

10. a