

Lovejoy Senior Lab Off-Site Learning Packet Day 7

Instructor Michael Lovejoy Date 2019-2020

Program/Class SR AST Period 5 - 8

Activities:

Chapter 24 On-Board Diagnostic Systems

1. Students will be able to identify what on-board diagnostics is used for with 100% accuracy.

1. On-board diagnostics
 - computer's ability to analyze circuit operations, and to store and output data on any problems
2. Scan tool
 - Communicates with vehicle computers
 - Retrieves trouble codes, displays circuit and sensor values, runs tests, and gives hints for finding problems
3. On-board diagnostics check almost every electrical/electronic part in every major system
4. If any abnormal values are found
 - Computer stores a trouble code
 - Lights malfunction indicator light on instrument panel

2. Students will be able to define OBD I systems with 100% accuracy.

1. OBD I systems
 1. On-board diagnostics generation one
 2. Early diagnostic systems
 3. Still millions of vehicles that use OBD I systems
 4. Early systems checked limited number of items
 5. Unable to detect weak circuits and components
 6. Little or no standardization between systems

3. Students will be able to identify 5 out of 6 benefits of OBDII systems.

1. Environmental Protection Agency (EPA)
 1. Passed vehicle pollution laws that require on-board diagnostic systems to detect problems before they produce harmful exhaust emissions
 2. Standardize monitoring systems
2. OBD II
 1. On-board diagnostics generation two
3. More efficiently monitor hardware and software that affect driveability emissions
4. Designed to keep vehicle running efficiently for at least 100,000 miles
5. Greater processing speed
6. More memory
7. More complex programming
8. Standardized
 1. Data link connections
 2. Trouble codes
 3. Sensor and output device terminology
 4. Scan tool capabilities

4. Students will be able to identify what MIL stands for with 100% accuracy.

1. In OBD II systems, engine warning light is referred to as malfunction indicator light (MIL)
2. If MIL glows continuously, trouble is not critical but should be repaired at owner's convenience
3. MIL light comes on and then goes out
 - Problem may be intermittent
4. A flashing MIL
5. Means that trouble could damage catalytic converter and is considered critical
6. Trouble code chart
 - Will state what each number code represents

5. Students will be able to identify what on-board diagnostics is used for with 100% accuracy.

1. Diagnostic trouble codes (DTC)

1. Digital signals produced and stored by computer
2. Trouble code chart
 1. Will state what each number code represents
3. Trouble code conversion
 1. Scan tool converts number code into abbreviated words
4. Operating parameter
 1. Acceptable minimum and maximum value

6. Students will be able to define OBD I systems with 100% accuracy.

1. Loose electrical connection
2. Corroded electrical connection
3. Failed sensor
4. Failed actuator
5. Leaking vacuum hose
6. Electrical short
7. Ignition system problems
8. Fuel system problems
9. Emission system problems
10. Engine problems
11. Computer malfunction
12. Weak or lazy component
13. Transmission problems
14. Anti-lock brake system problems
15. Air conditioning problems
16. Air bag problems
17. Hybrid electric drive train part and circuit malfunctions

7. Students will be able to define between the 2 kinds of scan tools with 100% accuracy.

1. Retrieve trouble codes from computer's memory and display these codes as numbers and words
2. Also called diagnostic readout tool

3. Makes it easier to read diagnostic trouble codes
4. In most cases, only way to access computer's diagnostic system
5. Basic scan tool
 - Designed to read and erase vehicle trouble codes
 - Cannot perform as many functions as advanced scan tool
6. Advanced scan tool
 - Plug-on cartridges to add more functions
 - Troubleshooting guides
 - More manufacturer specific tests and circuit readings

8. Students will be able to identify what MIL stands for with 100% accuracy.

1. Data link connector (DLC)
 - Multipin terminal used to link scan tool to computer
2. In the past, this connector was called
 - Diagnostic connector and assembly
 - Line diagnostic link (ALDL)
3. OBD I data link connectors
 - Came in various shapes and sizes
 - Equipped with varying number of pins or terminals
4. OBD II, DLC is standardized 16-pin connector

Assessment:

Students will receive 10 points for completing work sheet pages 129 to 131

Chapter 24

On-Board Diagnostics and Scan Tools



Name _____

Date _____

Instructor _____

Score _____

Objective: After studying this chapter, you will have a basic understanding of automotive on-board diagnostic capabilities and scan tools applications.

On-Board Diagnostic Systems

- _____ 1. An automotive computer system scans its input and output circuits to detect an incorrect _____.
 - (A) current
 - (B) voltage
 - (C) resistance
 - (D) All of the above.

2. A vehicle's engine _____ module can detect engine misfiring and air-fuel mixture problems. _____

3. If the on-board computer finds any abnormal values, it will store a _____. _____

4. What does *OBD I* stand for? _____

- _____ 5. OBD II is designed to _____.
 - (A) keep the vehicle running efficiently for at least 100,000 miles
 - (B) detect part deterioration
 - (C) monitor the condition of hardware that affects emissions
 - (D) All of the above.

6. OBD II systems can produce over _____ engine performance-related trouble codes. _____

7. Define *malfunction indicator light*. _____

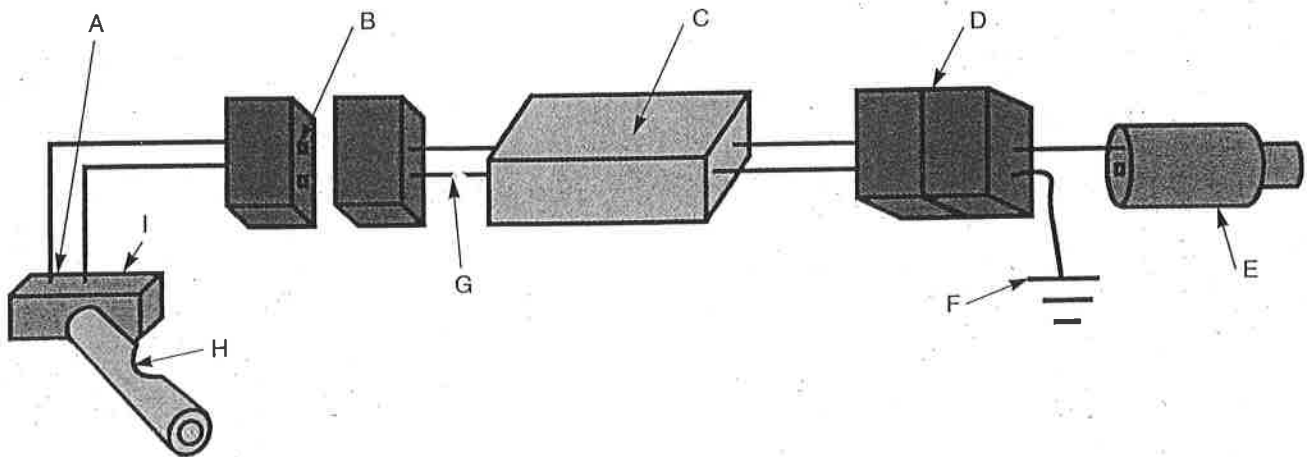
8. An MIL is flashing continuously in an OBD II equipped vehicle. Technician A says this problem is not critical but should be repaired. Technician B says this flashing MIL means the trouble could damage the catalytic converter and is, therefore, considered critical. Who is right?
- (A) A only.
 - (B) B only.
 - (C) Both A and B.
 - (D) Neither A nor B.

9. Explain *trouble code conversion*.

10. _____ are digital signals produced and stored by the computer when an operating parameter is exceeded.

11. A(n) _____ is an acceptable minimum and maximum value.

12. Identify the common problems that can affect an engine's performance.



- | | |
|-----------|-----------|
| (A) _____ | (F) _____ |
| (B) _____ | (G) _____ |
| (C) _____ | (H) _____ |
| (D) _____ | (I) _____ |
| (E) _____ | |

13. _____ percent of all engine performance problems are caused by faults in the computer or one of its sensors.

- (A) Fifteen
- (B) Twenty
- (C) Sixty
- (D) Eighty

Name _____

Scanning Computer Problems

14. What is a scan tool?

15. A(n) _____ tool is another name for a scan tool.

16. What are scan tool program cartridges?

17. A(n) _____ gives additional information on how to verify the source of various trouble codes.

18. Describe the function of a data link connector.

_____ 19. The standardized DLC connector used with OBD II systems has _____ pins.

- (A) four
- (B) sixteen
- (C) eighteen
- (D) None of the above.

20. Name at least three of the most common locations for the data link connector.

21. Sometimes it is necessary to use a(n) _____ in order for the scan tool connector to communicate with different pin configurations.

22. What are scan tool prompts? What purposes do they serve?
