Michigan Mechanic Engine Repair Practice Exam (Sample)

Study Guide

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Questions

1. Which tool is used to check crankshaft endplay?

A. An outside micrometer

B. A dial indicator

C. An inside micrometer

D. A thrust gauge

2. What does a compression test evaluate in an engine?

A. The efficiency of the fuel system

B. The pressure generated in each cylinder

C. The condition of the exhaust system

D. The performance of the ignition system

3. What must be done if the camshaft is worn beyond specifications?

A. Replace the lifters.

B. Replace the camshaft.

C. Replace the push rods.

D. Both A and B.

4. In what scenario would you expect to hear detonation in an engine?

A. During normal combustion processes

B. When using low-octane fuel in a high-performance engine

C. In the absence of spark plugs

D. With improper fuel injector alignment

5. What is the function of an engine's throttle body?

A. To store engine oil

B. To control the amount of air entering the engine

C. To assist with fuel injection

D. To measure exhaust emissions

6. For a 3-inch bore, what would be the approximate required ring end gap?

A. .0003 to .0004 inches

B. .040 to .050 inches

C. .009 to .012 inches

D. .001 to .003 inches

7. What are the minimum and maximum measurements of a shaft given 2.125 plus or minus .015?

A. 2.062-2.250.

B. 1.975-2.275.

C. 2.110-2.140.

D. 2.124-2.126.

8. What is a common sign of a failing fuel pump?

A. Engine stalling during acceleration

B. Excessive engine noise

C. Increased tire pressure

D. Irregular exhaust color

9. What is the correct adjustment point for valve tappet clearance during a rebuild?

A. At the end of the exhaust stroke.

B. After the engine has run for several hours.

C. At TDC during the compression stroke.

D. While the engine is cold.

10. What might indicate an overheating engine?

A. Unusual engine noises

B. Coolant loss

C. Low oil pressure warning light

D. Steam from under the hood

Answers

1. B
2. B
3. D
4. B
5. B
6. C
7. C
8. A
9. C
10. D

Explanations

1. Which tool is used to check crankshaft endplay?

A. An outside micrometer

B. A dial indicator

C. An inside micrometer

D. A thrust gauge

The correct choice for checking crankshaft endplay is a dial indicator. This tool is specifically designed to measure small distances with great precision, making it ideal for observing the lateral movement of the crankshaft relative to the engine block. When checking crankshaft endplay, one would typically attach the dial indicator to a fixed point and then push and pull on the crankshaft to register the amount of play on the dial, providing an accurate measurement of endplay. In contrast, other tools such as an outside micrometer and an inside micrometer serve different purposes. An outside micrometer measures the external dimensions of an object very accurately, while an inside micrometer is used for measuring internal diameters. Neither of these tools is suited for measuring the movement or play of the crankshaft itself. A thrust gauge, while it may seem relevant, is not commonly used for this specific measurement in the context of crankshaft endplay. Its application might be more aligned with measuring the actual thrust surfaces rather than measuring the play of the crankshaft within an engine. Therefore, the dial indicator stands out as the most appropriate and effective tool for checking crankshaft endplay due to its precision and ease of use in this application.

2. What does a compression test evaluate in an engine?

A. The efficiency of the fuel system

B. The pressure generated in each cylinder

C. The condition of the exhaust system

D. The performance of the ignition system

A compression test evaluates the pressure generated in each cylinder of an engine. This test involves cranking the engine and measuring the maximum pressure that builds up in each cylinder during the compression stroke. High compression readings indicate that the piston rings, cylinder walls, and valves are in good condition, allowing for proper sealing and efficient combustion. Conversely, low compression readings can signal issues such as worn or damaged piston rings, leaking valves, or head gasket failures, which can lead to poor engine performance, reduced power, and increased emissions. The other options focus on different systems within the engine. The efficiency of the fuel system pertains to how well fuel is delivered and atomized for combustion, while the condition of the exhaust system relates to the expulsion of gases and back pressure. The performance of the ignition system involves the ability to create and deliver a spark for combustion. Each of these components plays a crucial role in overall engine function, but a compression test specifically targets the internal sealing and pressure dynamics within the cylinders.

3. What must be done if the camshaft is worn beyond specifications?

A. Replace the lifters.

B. Replace the camshaft.

C. Replace the push rods.

D. Both A and B.

When a camshaft is worn beyond specifications, it can significantly impact the engine's performance and functionality. In this situation, replacing the camshaft is a necessary step, as a worn camshaft will not provide the required lift and timing needed for the engine's valves to operate efficiently. This can lead to poor engine performance, increased emissions, and potential engine damage. Additionally, it's essential to consider the lifters when the camshaft is replaced. Lifters, which follow the camshaft's contour, can also wear down over time. If the camshaft is significantly worn, the lifters may have become impacted as well. Replacing both the camshaft and the lifters ensures that all components of the valvetrain interact properly and helps to prevent future issues stemming from mismatched wear. Therefore, addressing both the camshaft and lifters is vital for maintaining optimal engine performance and longevity.

4. In what scenario would you expect to hear detonation in an engine?

A. During normal combustion processes

B. When using low-octane fuel in a high-performance engine

C. In the absence of spark plugs

D. With improper fuel injector alignment

Detonation, often referred to as "knocking" or "pinging," typically occurs when fuel in the engine's combustion chamber ignites prematurely, before the spark plug fires. This uncontrolled combustion produces a characteristic knocking noise and can lead to severe engine damage if not addressed. In high-performance engines designed for specific fuel octane ratings, using low-octane fuel can lead to this premature ignition.
High-performance engines operate at higher compression ratios which require fuels that can withstand this pressure without igniting early. Low-octane fuel, however, is more prone to premature combustion under these conditions, resulting in detonation. This scenario highlights the importance of matching fuel octane ratings with engine requirements to ensure optimal performance and prevent damage from detonation.

5. What is the function of an engine's throttle body?

A. To store engine oil

B. To control the amount of air entering the engine

C. To assist with fuel injection

D. To measure exhaust emissions

The throttle body plays a crucial role in regulating engine performance by controlling the amount of air that enters the engine's intake manifold. It consists of a plate that opens and closes in response to the driver's input on the accelerator pedal. When the pedal is pressed, the throttle plate opens, allowing more air into the engine, which in turn increases engine power and efficiency. This precise control over air intake is vital for maintaining the correct air-to-fuel ratio required for optimal combustion and overall engine operation. Understanding the function of the throttle body is essential for diagnosing issues related to engine performance, such as poor acceleration or increased emissions, which can result from a malfunctioning throttle body.

6. For a 3-inch bore, what would be the approximate required ring end gap?

A. .0003 to .0004 inches

B. .040 to .050 inches

C. .009 to .012 inches

D. .001 to .003 inches

The approximate required ring end gap for a 3-inch bore is correctly identified as falling within the range of .009 to .012 inches. This gap is important as it allows for the expansion of the piston rings due to heat generated during engine operation. A properly sized ring end gap helps to ensure effective sealing between the piston and the cylinder wall, which minimizes blow-by (the escape of combustion gases into the crankcase), and aids in oil control. If the gap is too small, it can lead to the rings being held tight against the cylinder wall as they expand, potentially causing the rings to deform or seize, which can result in serious engine damage. Conversely, if the gap is too large, it may not seal effectively, allowing more blow-by and reducing engine efficiency. The gap of .009 to .012 inches for a 3-inch bore is derived from established guidelines within the automotive repair community, accounting for variations in materials and operational conditions.

7. What are the minimum and maximum measurements of a shaft given 2.125 plus or minus .015?

A. 2.062-2.250.

B. 1.975-2.275.

C. 2.110-2.140.

D. 2.124-2.126.

To determine the minimum and maximum measurements of a shaft given a nominal size of 2.125 inches with a tolerance of plus or minus 0.015 inches, you start by calculating the range of acceptable measurements. The nominal size is 2.125 inches. When applying the tolerance of plus or minus 0.015 inches: 1. For the maximum measurement, you add the tolerance: - 2.125 + 0.015 = 2.140 inches 2. For the minimum measurement, you subtract the tolerance: - 2.125 - 0.015 = 2.110 inches This results in a range of 2.110 inches to 2.140 inches for the shaft dimensions. Therefore, the correct answer accurately reflects this calculation, showing that the shaft's dimensions fall between 2.110 and 2.140 inches. This emphasizes the importance of understanding tolerances in engineering and mechanical work, which ensures proper fit and function in assemblies.

8. What is a common sign of a failing fuel pump?

A. Engine stalling during acceleration

B. Excessive engine noise

C. Increased tire pressure

D. Irregular exhaust color

A common sign of a failing fuel pump is engine stalling during acceleration. The fuel pump plays a crucial role in delivering fuel from the tank to the engine. When the pump begins to fail, it may not supply an adequate amount of fuel, especially under load, like during acceleration. This lack of fuel can cause the engine to cut off momentarily or stall, leading to a loss of power and potentially dangerous driving conditions. The other choices do not directly indicate fuel pump issues. Excessive engine noise could suggest problems such as worn components or issues with the engine itself. Increased tire pressure is unrelated to the fuel system and is more related to environmental conditions or improper maintenance of the tires. Irregular exhaust color is often indicative of combustion problems or issues with the engine but not directly linked to fuel pump failure.

9. What is the correct adjustment point for valve tappet clearance during a rebuild?

A. At the end of the exhaust stroke.

B. After the engine has run for several hours.

C. At TDC during the compression stroke.

D. While the engine is cold.

The correct adjustment point for valve tappet clearance during a rebuild is at the top dead center (TDC) during the compression stroke. This position of the piston indicates that both the intake and exhaust valves for that cylinder are closed. Adjusting valve clearance at this point ensures that the tappets are free of pressure from the pushrods and that the valvetrain components are at their resting position, allowing for an accurate measurement and setting of the clearance. Having the engine at TDC during the compression stroke is essential because any movement of the valves can lead to a misadjustment, resulting in improper valve operation, which can affect engine performance, power, and efficiency. Properly setting the clearance at this specific point enables the necessary gap for thermal expansion and the movement of the valvetrain to function correctly during engine operation. Adjusting valve clearance after the engine has been running, while presumably more convenient, may result in inaccurate measurements due to heat causing the components to expand. Similarly, performing the adjustment while the engine is cold or at the end of the exhaust stroke does not provide the same level of assurance that the valves are in the correct position for measurement. Thus, TDC during the compression stroke is the ideal time for this adjustment.

10. What might indicate an overheating engine?

A. Unusual engine noises

B. Coolant loss

C. Low oil pressure warning light

D. Steam from under the hood

An indication of an overheating engine is the presence of steam coming from under the hood. When the engine temperature exceeds normal levels, it can lead to the boiling of the coolant. This results in steam being expelled, often visible as it escapes from various areas under the hood, particularly around the radiator or coolant hoses. The sight of steam is a direct sign that the engine is not able to dissipate heat effectively, which typically points to issues such as coolant leaking or malfunctioning cooling components. Other indicators, such as unusual engine noises or low oil pressure, might suggest other mechanical problems, and coolant loss might reflect a separate issue but doesn't provide an immediate visual indication of overheating. However, steam is a strong visual cue linking directly to the need for urgent attention to the engine's cooling system.