

What Is a Brake System and How Does It Work?

Worksheet

A brake system works by applying friction pads against a rotor or drum when the driver pushes the pedal, transmitting force through hydraulic fluid. Power brakes use engine power to amplify this force.

Questions

1. What does the master cylinder do?

- A) Stops the car
- B) Pressurizes hydraulic fluid
- C) Cools brake rotors
- D) Applies brake pads

2. Soft brake pedal indicates...

- A) Normal operation
- B) Worn pads only
- C) Air or fluid leak in system
- D) Rotor needs replacement

3. Energy conversion in braking?

- A) Kinetic → potential
- B) Kinetic → heat
- C) Heat → kinetic
- D) Potential → kinetic

4. ABS prevents...

- A) Pad wear
- B) Wheel lock-up
- C) Heat generation
- D) Rotor damage

5. Driver presses brake pedal. Trace the hydraulic force path to the wheel.

6. What happens if hydraulic fluid leaks from a brake line?

7. Why do brakes get hot after descending a long mountain road?

8. Define: Main components of a hydraulic brake system?

9. Define: What does the master cylinder do?

10. Define: What converts kinetic energy into braking force?

Answer Key

1. B) Pressurizes hydraulic fluid — Master cylinder converts pedal force into hydraulic pressure.
2. C) Air or fluid leak in system — Soft pedal = pressure loss from air or fluid leak.
3. B) Kinetic → heat — Braking friction converts motion (kinetic energy) to heat.
4. B) Wheel lock-up — ABS keeps wheels rolling (instead of locking) for control during hard braking.
5. 1. Pedal press creates force at master cylinder 2. Master cylinder pressurizes hydraulic fluid 3. Fluid flows through brake lines to wheel cylinders 4. Pressure pushes pistons, which press pads against rotor 5. Friction creates braking force; kinetic energy → heat
6. 1. Fluid leakage = pressure loss 2. Reduced fluid = reduced force transmission 3. Brake pedal feels soft or sinks to floor 4. Result: Brakes may fail partially or completely 5. Action: Stop vehicle safely and call for service — DO NOT DRIVE
7. 1. Continuous braking converts kinetic energy to heat 2. Friction pads & rotor absorb repeated energy 3. Heat accumulates without cooling time 4. Rotor temperatures can exceed 300°C 5. Solution: Use lower gear (engine braking) to reduce brake load
8. Brake pedal, master cylinder, brake lines, wheel cylinders, friction pads, and rotor.
9. Converts pedal force into hydraulic pressure to be transmitted to the wheels.
10. Friction between brake pads and the rotor (or drum). Energy becomes heat.

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