BONUS SECTION 4: PARKING BRAKE SYSTEMS

10 Targeted Practice Questions

1. A vehicle with rear drum brakes has a parking brake that engages firmly but the vehicle rolls slowly forward on an incline when the parking brake is applied. All cables and linkages are in good condition. The self-adjusters are functioning correctly. The MOST likely cause is:

A. The parking brake cable tension is insufficient and requires adjustment at the equalizer

B. The rear brake shoe friction linings are glazed, worn, or contaminated, providing inadequate holding friction against the drum

C. The parking brake strut inside the drum is bent, reducing the mechanical advantage of the lever system

D. The parking brake pedal or lever mechanism has a ratchet that is not engaging fully, allowing partial release under sustained load

2. An electric parking brake (EPB) system replaces the traditional cable-actuated parking brake with:

A. A separate hydraulic circuit that applies the rear calipers independently from the service brake system

B. An electric motor actuator integrated into the rear brake caliper that mechanically drives a screw mechanism to apply and hold the caliper piston against the brake pad

C. Electromagnets mounted at the rear axle that clamp the brake rotors directly without using caliper pistons

D. A vacuum-actuated rear caliper cylinder that applies the parking brake when the driver activates the EPB switch

3. A vehicle with a drum-in-hat rear disc brake parking brake system has a parking brake that requires 15–18 clicks to hold on a grade. The rear service brakes function normally. The MOST likely cause is:

A. The rear service brake caliper pistons are retracted too far, pulling the parking brake shoes out of adjustment

B. The small parking brake shoes inside the rotor hat are not properly adjusted to the inner drum surface of the rotor hat

C. The parking brake cables have stretched and require replacement

D. The rear rotors have worn beyond their minimum thickness, increasing the inner drum diameter beyond the shoes' reach

4. When servicing a vehicle equipped with an electric parking brake (EPB), a technician must perform rear brake pad replacement. Before beginning, the technician must:

A. Disconnect the EPB actuator motor wiring harness to prevent accidental activation during service

B. Use a scan tool to command the EPB into service mode, which retracts the rear caliper pistons electronically to allow pad clearance

C. Manually compress the rear caliper piston using a standard piston compression tool while the EPB is in the normal position

D. Remove the EPB actuator motor from the caliper before compressing the piston to prevent motor damage

5. A rear drum brake parking brake system uses a parking brake strut inside the drum. The strut's function is to:

A. Hold the primary shoe against the anchor pin when the parking brake is applied

B. Transmit the force from the parking brake lever on one shoe to the opposite shoe, spreading both shoes outward against the drum simultaneously

C. Prevent the brake shoes from rattling against the backing plate when the parking brake is released

D. Limit the maximum shoe travel during parking brake application to prevent drum overheating

6. A vehicle's parking brake warning light illuminates whenever the brake pedal is pressed during normal driving, even with the parking brake fully released. No codes are stored and the brake fluid level is full. The MOST likely cause is:

A. The brake pedal switch is wired incorrectly and is completing the parking brake warning circuit under pedal load

B. A short circuit between the stop lamp circuit and the parking brake warning lamp circuit in the instrument cluster wiring

C. The parking brake warning switch is misadjusted and is being triggered by the slight movement of the parking brake lever or pedal under vibration from normal braking

D. The pressure differential switch is activating momentarily under brake pedal application pressure fluctuations

7. A technician adjusts the parking brake on a rear drum brake vehicle. After adjustment, with the parking brake fully released, the technician spins the rear wheels by hand and notices slight drag at both rear wheels. The correct action is:

A. Accept the slight drag since parking brake cables always maintain minimal tension for immediate engagement

B. Back off the cable adjustment at the equalizer until both rear wheels spin freely with no drag when the parking brake is fully released

C. Inspect both rear wheel cylinders for seizure since drag after parking brake adjustment indicates a wheel cylinder problem

D. Replace both rear brake shoe return springs since weak springs allow the shoes to drag after parking brake release

8. A customer reports that after applying the parking brake and releasing it on a cold morning, there is a loud pop or bang from the rear of the vehicle when driving forward. The service brake function is normal. The MOST likely cause is:

A. A broken parking brake return spring allowing the shoe to slap against the backing plate on initial movement

B. The rear brake shoe linings have frozen to the drum surface overnight and are breaking free during the first wheel rotation

C. A seized parking brake cable that snaps loose from a frozen position when vehicle movement overcomes the ice bond

D. The parking brake ratchet mechanism is releasing suddenly rather than smoothly, causing a mechanical clunk

9. A vehicle with a rear disc brake parking brake integrated into the rear caliper uses a self-adjusting mechanism for the parking brake function. This self-adjuster maintains proper parking brake function by:

A. Automatically tensioning the parking brake cables whenever the service brakes are applied during a reverse stop

B. Mechanically advancing the caliper piston as brake pad material wears, maintaining a consistent relationship between the pad surface and the mechanical parking brake actuator travel

C. Electronically monitoring pad thickness and commanding cable tension adjustment through the EPB control module

D. Using a ratchet spring that advances the star wheel adjuster whenever the parking brake cable is pulled beyond a threshold tension

10. A vehicle fails a state safety inspection because the parking brake is inoperative. The technician inspects the system and finds both rear parking brake cables are intact and properly routed. The cables will not pull when the parking brake lever is actuated. The MOST likely cause is:

A. Both rear parking brake cables have simultaneously seized in their conduits from corrosion

B. The parking brake equalizer or intermediate cable that connects the lever to the rear cables has broken or become disconnected

C. The parking brake lever ratchet mechanism has failed, preventing it from generating pulling force on the cables

D. Both rear brake shoe anchor pins have sheared, preventing the shoes from expanding when cable force is applied

BONUS SECTION 4 — ANSWERS AND EXPLANATIONS

1. B — Glazed, worn, or contaminated shoe linings — Parking brake holding force depends entirely on friction between the shoe lining and drum. Glazed linings have a polished, hardened surface with a greatly reduced coefficient of friction. Worn linings have less material contacting the drum. Contaminated linings may grip initially but release under sustained load. All three conditions result in a parking brake that engages but cannot maintain holding force on a grade.

2. B — Electric motor drives screw mechanism inside caliper — EPB actuators are compact electric motors integrated into the rear caliper body. When activated, the motor rotates a reduction gear set that drives a screw or ball-and-ramp mechanism, converting rotational motor output into linear piston movement to apply and hold the brake pad against the rotor. This eliminates all cables and mechanical linkages from the parking brake system.

3. B — Parking brake shoes inside rotor hat need adjustment — The drum-in-hat design uses dedicated small brake shoes that contact the inner cylindrical drum surface machined into the rotor hat. These shoes have their own separate adjustment specification. If not properly adjusted close to the inner drum surface, the parking brake cable must be pulled through many clicks before the shoes expand far enough to contact the drum and develop holding force.

4. B — Scan tool service mode retracts pistons electronically — EPB rear caliper pistons cannot be compressed with a standard push-in tool because they are mechanically driven by the EPB motor rather than freely floating. Attempting to force the piston without service mode active risks stripping the motor gears or damaging the actuator mechanism. Service mode commands the motor to run in reverse, fully retracting the piston to provide clearance for new pad installation.

5. B — Transmits force to spread both shoes against drum — The parking brake strut is a rigid horizontal bar between the two brake shoes inside a drum brake assembly. When the parking brake cable pulls the lever on one shoe, the force is transmitted through the strut to the opposite shoe simultaneously. Both shoes are pushed outward against the drum with equal force, creating the bi-directional clamping action needed for parking brake holding.

6. C — Parking brake switch triggered by vibration during braking — A switch that is adjusted to a position very close to its trigger point can be activated by the slight mechanical vibration and movement transmitted through the parking brake lever or pedal assembly during normal service brake application. Readjusting the switch to require more lever travel before activation eliminates this false triggering without affecting normal parking brake warning function.

7. B — Back off cable adjustment until wheels spin freely — When both rear wheels drag with the parking brake fully released after a cable adjustment, the cables have been adjusted too tight. Residual tension in the cables is holding the brake shoes slightly off the fully retracted position,

causing constant light contact with the drum. This causes brake drag, premature shoe wear, and heat buildup. The cables must be backed off until no drag exists in the released position.

8. B — Shoe linings frozen to drum surface overnight — In cold, wet conditions, moisture between the brake shoe lining and cast iron drum surface can freeze overnight, bonding the lining to the drum. When the vehicle moves forward after parking brake release, the adhesive bond between the frozen lining and drum surface breaks suddenly with a loud pop. This is a common cold-weather phenomenon that requires no repair unless it damages the lining.

9. B — Advances piston as pad wears to maintain actuator travel — As rear brake pads wear and the caliper piston extends further from the bore, the relationship between the piston face and the mechanical parking brake actuator changes. The self-adjuster automatically advances the piston position to compensate for this wear, ensuring the parking brake actuator always has the same effective mechanical travel regardless of pad thickness.

10. B — Equalizer or intermediate cable broken or disconnected — The equalizer is the central junction that distributes force from the single parking brake lever equally to both rear cables. If the equalizer itself has broken, a cable has pulled through a clevis, or the intermediate cable connecting the lever to the equalizer has snapped, no force reaches the rear cables regardless of how firmly the lever is pulled. This is the most common cause of a completely inoperative parking brake with intact rear cables.