BONUS SECTION 5: DRUM BRAKE COMPONENTS AND REPAIR

10 Targeted Practice Questions

1. A technician is inspecting rear drum brakes and finds the brake drum has a bell-mouthed condition. Bell-mouthing describes:

A. A drum that has developed a tapered shape where the open edge diameter is larger than the diameter at the closed end near the hub

B. A drum with a perfectly cylindrical bore that has developed a series of shallow grooves from embedded debris

C. A drum where the friction surface has developed a shiny, glazed appearance from overheating

D. A drum that has cracked at the mounting flange from repeated thermal cycling

2. When installing drum brake return springs, a technician must use the correct spring for each position. Primary and secondary return springs are:

A. Interchangeable since both springs perform the same retraction function and have identical specifications

B. Different spring rates — the secondary shoe spring typically has higher tension since the secondary shoe carries more of the braking load and must retract more forcefully

C. Distinguished by color coding and must be installed in their correct positions since incorrect installation affects self-energizing action and pedal feel

D. Both replaced with universal springs of any matching diameter since the exact tension is not critical to drum brake function

3. A drum brake self-adjuster operates by advancing the star wheel when excess shoe-to-drum clearance develops. On most rear drum brake designs, adjustment occurs:

A. Continuously during every forward brake application as the shoes wear

B. During reverse braking or when the parking brake is applied, as the shoe movement in this direction actuates the adjuster lever

C. Only when a technician manually backs off the star wheel and releases it to allow spring-loaded automatic reset

D. At predetermined mileage intervals when the brake warning system detects excessive pedal travel

4. A technician finds a drum brake wheel cylinder where both pistons are pushed outward and brake fluid is weeping from both boots. The correct repair procedure is to:

A. Push the pistons back in, replace both boots, and return the wheel cylinder to service

B. Rebuild the wheel cylinder with a hone, new cups, and new boots if the bore is within the manufacturer's serviceable diameter specification

C. Replace the wheel cylinder — a leaking wheel cylinder should be replaced, not rebuilt, in most service situations

D. Either B or C are acceptable repair options depending on bore condition and the technician's preference

5. During a drum brake inspection, a technician finds all the brake hardware — hold-down springs, return springs, and self-adjuster components — are original and have never been replaced despite the shoes being replaced twice. The correct recommendation is:

A. Leave the hardware in service since hardware does not wear like friction material and rarely requires replacement

B. Replace all hardware as a complete kit since springs lose tension and adjuster components corrode over time, compromising shoe movement and adjustment

C. Replace only the self-adjuster components since those are the most functionally critical hardware items

D. Replace only the return springs if they show visible deformation or if any are broken

6. A customer reports a rear drum brake that drags continuously. The wheel cylinder is not leaking and the brake fluid level is normal. After releasing the parking brake, the drag persists. The technician finds the shoe-to-backing plate contact ledges are heavily rusted. This finding is significant because:

A. Rust on the ledges is cosmetic and will not prevent shoe retraction in a functional braking system

B. Corroded ledges create friction that prevents the return springs from fully retracting the shoes to their rest position, causing continuous light contact with the drum

C. Rust on the ledges indicates the drum interior is also corroded, causing the shoes to stick to the drum surface directly

D. The rust indicates moisture has entered the brake fluid through the wheel cylinder, reducing its effectiveness

7. A drum brake shoe is described as a leading shoe in a leading-trailing configuration. The leading shoe is defined as:

A. The shoe positioned toward the front of the vehicle regardless of drum rotation direction

B. The shoe whose contact with the drum creates a self-energizing or servo effect — drum rotation pulls the shoe into tighter contact, increasing braking force beyond what hydraulic pressure alone would produce

C. The shoe that contacts the drum first during initial brake application due to its position relative to the wheel cylinder

D. The longer of the two shoes in a duo-servo arrangement that carries the majority of the braking load

8. A technician is replacing drum brake shoes on a rear axle and notices the new shoes are slightly shorter in arc length than the originals. The correct action is to:

A. Grind the drum contact surface to match the shorter arc length of the new shoes

B. Arc grind the new shoes to match the drum radius before installation to ensure full contact area

C. Verify the correct part number — incorrect arc length reduces the effective friction area and braking efficiency

D. Install the shorter shoes and allow normal burnishing to expand the contact area to full drum width over time

9. A technician performing a drum brake job notices the hold-down pins that pass through the backing plate have developed rust and are difficult to remove. After cleaning and reinstalling them, the technician should:

A. Apply a thin coat of anti-seize compound to the pin shafts to prevent future corrosion and ease removal at the next service

B. Apply high-temperature brake lubricant only to the shoe contact areas — hold-down pins should be installed dry

C. Replace the hold-down pins since corrosion indicates the backing plate is compromised and the pins will corrode again immediately

D. Leave the pins dry since any lubricant on the pins will migrate to the shoe linings and contaminate the friction surfaces

10. A vehicle with rear drum brakes has a parking brake that holds properly but during normal service braking the rear brakes produce a loud grinding noise. The shoes were replaced 6 months ago and the drums were within specification at that time. The grinding is present at both rear wheels. The MOST likely cause is:

A. The replacement shoes were installed without cleaning the backing plate ledges, causing shoe-to-metal contact

B. The shoe linings have separated from the shoe table and the metal backing is now contacting the drum

C. The drums have developed heat cracks that are catching the shoe edge during rotation

D. The self-adjusters have over-adjusted the shoes so tightly against the drum that the lining is wearing through rapidly

BONUS SECTION 5 — ANSWERS AND EXPLANATIONS

1. A — Open edge diameter larger than closed end — Bell-mouthing is a tapered wear pattern where the drum's friction surface is wider in diameter at the open face than at the closed hat end. This taper results from the shoe contact pressure being concentrated slightly toward the open edge over time. A bell-mouthed drum cannot be fully corrected by machining and must be replaced when the taper exceeds specification.

2. C — Color coded and must be in correct positions — Return spring color coding varies by manufacturer but the principle is consistent: primary and secondary springs have different tension ratings and must be installed in their designed positions. Swapping the springs changes the shoe return force balance, affecting the self-energizing characteristics, pedal feel, and the timing of shoe-to-drum contact during application and release.

3. B — Adjustment occurs during reverse braking or parking brake application — In most rear drum brake designs, the adjuster lever is positioned to advance the star wheel when the shoe moves in the direction associated with reverse braking. As the shoe travels farther during a reverse stop due to wear-increased clearance, the lever indexes the star wheel one tooth, reducing the clearance. This prevents the adjuster from advancing prematurely during normal forward braking.

4. D — Either rebuild or replace are acceptable — A leaking wheel cylinder can be rebuilt with a hone and new cup kit if the bore diameter is within the manufacturer's maximum allowable specification and the bore surface is smooth and free of pitting. If the bore shows scoring, pitting, or exceeds the maximum diameter, replacement is required. Both repair paths are legitimate and the choice depends on bore condition and shop practice.

5. B — Replace all hardware as a complete kit — Brake return springs undergo thousands of heat and tension cycles over their service life. They gradually lose their calibrated spring rate without visibly breaking. Worn springs allow slower shoe retraction, causing brake drag, reduced pedal feel, and uneven wear. Corroded adjuster components bind and fail to self-adjust. Replacing all hardware with a complete kit during every shoe replacement is the professional standard.

6. B — Corroded ledges prevent full shoe retraction — The shoe web rides on raised contact ledges stamped into the backing plate. These ledges are the pivot and sliding surfaces for shoe movement during application and retraction. When heavily corroded, these surfaces become rough and create enough friction to overpower the return spring tension, preventing the spring from pulling the shoe fully away from the drum and causing continuous contact and drag.

7. B — Self-energizing shoe pulled tighter by drum rotation — The leading shoe in a leading-trailing brake experiences a self-energizing effect because the direction of drum rotation wedges the trailing edge of the shoe more firmly against the drum as brake force increases. This mechanical amplification allows the leading shoe to generate significantly more braking force than the hydraulic application pressure alone would produce, which is why the leading shoe typically wears faster than the trailing shoe.

8. C — Verify correct part number — Arc length determines how much of the drum's interior circumference the shoe contacts. A shorter shoe contacts less of the drum surface, reducing the total friction area available for braking force generation. This reduces stopping effectiveness, causes uneven heat distribution, and accelerates wear on the reduced contact area. The correct replacement shoe must match the drum's radius and arc length specification.

9. A — Apply anti-seize to pin shafts — Hold-down pins pass through the backing plate and are exposed to moisture and road salt from both sides. Applying a thin coat of anti-seize compound to the pin shafts prevents galvanic corrosion between the steel pin and the backing plate, making future removal straightforward. The pin heads are far enough from the friction surfaces that lubricant migration to the linings is not a concern.

10. B — Shoe lining separated from shoe table — Grinding at both rear wheels that develops progressively after a recent shoe replacement and was not present initially suggests a material failure rather than a service error. Lining-to-shoe table separation — caused by rust jacking between the bonded lining and steel shoe, improper bonding, or poor quality replacement parts — exposes the steel shoe web to direct drum contact, producing severe grinding immediately upon contact.