PRACTICE EXAM 7: T3 SIMULATION (40 QUESTIONS)

DOMAIN A — CLUTCH (Questions 1–11)

1. A heavy-duty Class 8 tractor arrives at the shop with a complaint that the clutch pedal "fell to the floor" while driving. The clutch fluid reservoir is empty. The proper first action is to:

A. Inspect for hydraulic leaks at the master cylinder, slave cylinder, and connecting lines

B. Refill the reservoir and immediately return the truck to service for road testing

C. Replace the master and slave cylinders as preventive maintenance procedure

D. Apply battery voltage to the clutch hydraulic components for diagnostic testing

2. Technician A says a clutch that releases properly when cold but fails to release when hot indicates a worn clutch disc. Technician B says a clutch that releases properly when cold but fails to release when hot indicates thermal expansion problems in the hydraulic system. Who is correct?

A. Both Technician A and Technician B

B. Technician A only

C. Technician B only

D. Neither Technician A nor Technician B

3. The proper diagnostic priority when a heavy-duty truck shows a complaint of clutch slip under acceleration is:

A. Replace the clutch assembly as preventive maintenance during the same visit

B. Verify pedal free play, internal adjustment, and clutch component condition systematically

C. Apply battery voltage to the clutch components for diagnostic testing during service

D. Listen with a stethoscope at the clutch housing during light acceleration only

4. A fleet maintenance manager reviews three heavy-duty tractors with the same complaint of grinding into reverse from a complete stop. All three trucks have over 400,000 miles and have not had clutch service in their entire service life. The most likely common cause is:

A. Failed pilot bearings on all three units affecting input shaft support

B. Worn clutch facings reducing clamping force during all engagement events

C. Air introduced into the hydraulic systems during fleet refueling operations

D. Worn or out-of-adjustment clutch brakes on all three high-mileage units

5. The proper procedure for adjusting a heavy-duty pull-type clutch with manual internal adjustment is to:

A. Apply battery voltage to the adjustment ring for diagnostic testing

B. Remove the clutch assembly and adjust on a workbench during service

C. Use the access hole in the clutch housing with the engine off and parking brake set

D. Adjust the external linkage at the cross shaft until specification is achieved

6. The most accurate description of clutch brake purpose is to:

A. Stop the input shaft from rotating during engagement of starting gears from a stop

B. Apply braking force to the engine flywheel during downshift operations

C. Provide additional clamping force during heavy load operating conditions

D. Cool the clutch assembly during extended slipping conditions during operation

7. The LEAST likely cause of premature release bearing failure on a heavy-duty truck is:

A. The driver riding the clutch pedal during normal vehicle operation

B. Insufficient external pedal free play preventing complete release bearing retraction

C. Missing or insufficient release fork pivot lubrication during normal operation

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

8. The proper procedure for verifying a heavy-duty hydraulic clutch slave cylinder operation is to:

A. Apply battery voltage to the slave cylinder for diagnostic testing during service

B. Observe slave cylinder pushrod movement when the clutch pedal is depressed

C. Replace the slave cylinder as preventive maintenance regardless of condition

D. Listen for slave cylinder operation with a stethoscope at idle conditions

9. A heavy-duty truck arrives with a complaint that the clutch makes a squeaking noise during pedal application. The most likely cause is:

A. Worn pilot bearing producing noise during clutch engagement

B. Worn release bearing producing noise during pedal travel

C. Dry release fork pivot or linkage points requiring lubrication during service

D. Worn clutch facings producing noise during all operating conditions

10. The most accurate description of clutch master cylinder pushrod adjustment is:

A. Sets external pedal free play before the master cylinder primary seal engages

B. Adjusts internal clutch clamping force during normal operation conditions

C. Controls the clutch brake engagement timing during pedal application

D. Determines the clutch disc thickness specification during service operations

11. The proper diagnostic approach when a customer complaint of clutch chatter cannot be reproduced during shop testing is to:

A. Replace the clutch assembly as preventive maintenance based on complaint history

B. Apply battery voltage to clutch components for diagnostic testing during service

C. Document conditions when complaint occurs, perform extended road test, and inspect components

D. Refuse the repair since the symptom cannot be verified during the shop visit

DOMAIN B — TRANSMISSION (Questions 12–24)

12. A heavy-duty AMT sets fault codes for both clutch position sensor and input shaft speed sensor. The proper diagnostic priority is to:

A. Replace both sensors immediately as the most likely failure components

B. Apply battery voltage to both sensors for diagnostic verification during service

C. Replace the TCM as the primary repair for multiple sensor fault codes

D. Verify J1939 data bus communication and inspect common power/ground connections

13. The most accurate description of the J1939 data bus role in heavy-duty AMT operation is:

A. Provides communication between engine ECM, TCM, and other vehicle modules during shifts

B. Provides direct mechanical control of shift actuators during normal operation

C. Replaces all hydraulic control during AMT operation conditions

D. Controls all electrical systems on the truck through a single data bus

14. Technician A says the proper torque value for heavy-duty transmission countershaft retaining nuts is determined by visual estimation. Technician B says the proper torque value is determined by manufacturer service information for the specific transmission model. Who is correct?

A. Both Technician A and Technician B

B. Technician B only

C. Technician A only

D. Neither Technician A nor Technician B

15. The proper procedure when a heavy-duty manual transmission shows a leak at the rear yoke seal is to:

A. Apply silicone sealer to the area to stop the leak during the same service visit

B. Continue operation since rear seal leakage has minimal effect on operation

C. Apply battery voltage to the seal area for diagnostic testing during service

D. Replace the seal, inspecting for yoke surface damage that may damage the new seal

16. The most likely consequence of installing a heavy-duty transmission output shaft seal without inspecting the yoke sealing surface is:

A. No effect on seal life regardless of yoke surface condition during installation

B. Improved seal life from reduced inspection time during service operations

C. Premature seal failure from yoke surface defects damaging the new seal

D. Improved sealing performance from elimination of inspection requirements

17. The proper measurement procedure for a heavy-duty transmission countershaft endplay is to:

A. Use a dial indicator to measure axial movement at the countershaft end during inspection

B. Apply battery voltage to the countershaft for diagnostic testing during measurement

C. Listen for endplay-related noise with a stethoscope at idle during operation

D. Estimate endplay visually using shop lighting during the inspection process

18. The LEAST likely cause of a heavy-duty AMT that fails to complete a commanded upshift is:

A. Insufficient air supply pressure preventing pneumatic actuator operation

B. Failed shift rail position sensor not confirming gear engagement

C. TCM software calibration issues affecting shift logic decisions

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

19. The most accurate description of heavy-duty AMT clutch protection mode is:

A. Manual control allowing the driver to manage clutch engagement during all operations

B. ECM-controlled function that limits clutch slipping to prevent overheating damage

C. Hydraulic limitation preventing complete clutch engagement during all operations

D. Pneumatic restriction reducing maximum clutch engagement force during operation

20. The proper service procedure when reusing transmission case bolts during rebuild is:

A. Reuse all bolts regardless of condition since transmission case bolts are not torque-to-yield

B. Apply maximum torque during installation to compensate for any thread wear

C. Inspect threads, replace any damaged bolts, and torque to specification per service info

D. Apply anti-seize compound to all threads to ensure proper torque retention

21. A heavy-duty manual transmission produces a clicking noise during gear engagement that disappears once the gear is fully engaged. The most likely cause is:

A. Insufficient transmission lubricant level affecting normal engagement operations

B. Worn shift fork pads allowing partial engagement during the shift sequence

C. Damaged gear teeth preventing complete engagement during the shift

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

22. The proper measurement procedure for heavy-duty AMT clutch facing wear is to:

A. Apply battery voltage to the clutch for diagnostic testing during measurement

B. Remove the clutch and measure facing thickness against minimum specification limits

C. Listen for clutch wear with a stethoscope at idle during operation conditions

D. Use scan tool to monitor clutch position sensor data and calculated wear values

23. The most accurate description of heavy-duty manual transmission lubricant flow during operation is:

A. Splash distribution from rotating gears throughout the transmission case interior

B. Pressurized circulation through internal passages from a gear-driven pump

C. Engine oil supplied from the main oil gallery through external lines

D. Gravity feed from a reservoir mounted above the transmission case

24. The LEAST likely cause of a heavy-duty manual transmission that produces a humming noise in all gears including neutral with the clutch engaged is:

A. Worn input shaft bearings producing noise under all rotation conditions

B. Worn countershaft bearings affected by all gear engagement conditions

C. A failed coolant temperature sensor reading falsely cold to the engine ECM

D. Worn output shaft bearings producing noise in all driven conditions

DOMAIN C — DRIVESHAFT AND U-JOINTS (Questions 25–31)

25. The proper first action when a heavy-duty truck arrives with a complaint of driveline vibration that occurs only at highway speeds is to:

A. Replace the driveshaft assembly as preventive maintenance procedure

B. Verify the complaint through road test, then inspect driveshaft components systematically

C. Apply battery voltage to the driveshaft for diagnostic testing during operation

D. Listen for vibration with a stethoscope at idle conditions during shop inspection

26. The most accurate description of a heavy-duty driveshaft slip joint lubrication is:

A. Lifetime sealed without service requirement during normal operation

B. Engine oil supplied from the main oil gallery through external lines

C. Hydraulic fluid from a dedicated reservoir during normal operation

D. Grease applied through a fitting at manufacturer-specified intervals

27. Technician A says heavy-duty driveshaft U-joint operating angle differential between front and rear joints should be less than 1 degree for vibration cancellation. Technician B says U-joint operating angles can vary by 5 to 10 degrees without vibration concerns during normal operation. Who is correct?

A. Technician A only

B. Both Technician A and Technician B

C. Technician C only

D. Neither Technician A nor Technician B

28. The proper procedure when a heavy-duty driveshaft yoke shows surface galling at the slip joint splines is to:

A. Apply lubricant to the galled area and return the driveshaft to service operations

B. Continue operation since galling has minimal effect during normal operation

C. Replace the slip joint or driveshaft assembly per service information requirements

D. Apply battery voltage to the area for diagnostic testing during service procedures

29. The most likely cause of a heavy-duty driveshaft that develops a vibration only during specific RPM ranges in highway operation is:

A. Driveshaft tube damage from external impact during recent operation

B. Worn slip joint causing length compensation problems during cycling

C. Failed center support bearing rubber mount allowing excessive driveshaft movement

D. Resonance condition from imbalance, U-joint wear, or operating angle problems

30. The LEAST likely consequence of operating a heavy-duty driveshaft with worn U-joints in the early stages of failure is:

A. Loss of vehicle steering control during normal highway operation conditions

B. Vibration that progressively increases with continued operation during service

C. Accelerated wear on adjacent driveshaft components during continued operation

D. Eventual U-joint catastrophic failure if the wear is allowed to continue

31. The proper inspection procedure for a heavy-duty driveshaft center support bearing includes:

A. Apply battery voltage to the bearing housing for diagnostic testing during service

B. Verify bearing rotation, rubber isolation mount condition, and absence of binding or noise

C. Listen for center support bearing operation with a stethoscope at idle during operation

D. Replace the center support bearing as preventive maintenance regardless of condition

DOMAIN D — DRIVE AXLE (Questions 32–40)

32. A heavy-duty tandem drive axle with new ring and pinion gears shows a heel-side concentrated tooth contact pattern after marking compound check. The proper correction is to:

A. Increase pinion depth using thicker shims behind the pinion bearing race during service

B. Decrease pinion depth using thinner shims behind the pinion bearing race during service

C. Adjust differential carrier preload to higher specification during the service procedure

D. Replace the ring and pinion gear set with new components during the service procedure

33. The most accurate description of TMC RP 618 application is:

A. Engine performance specifications for heavy-duty diesel applications during service

B. Transmission shift specifications for AMT applications during normal operation

C. Brake adjustment specifications for heavy-duty truck applications during service

D. Industry-standard wheel bearing torque procedures for heavy-duty applications

34. The proper diagnostic priority when a heavy-duty drive axle shows a fluid contamination level exceeding service specification during analysis is to:

A. Continue operation since fluid contamination has minimal effect on drive axle service life

B. Drain the contaminated fluid, inspect for the contamination source, and refill with proper fluid

C. Apply battery voltage to the drive axle for diagnostic testing during the service operation

D. Replace the drive axle assembly as preventive maintenance during the same service visit

35. The proper service action when a heavy-duty drive axle wheel seal shows minor weeping during routine inspection is to:

A. Continue operation since minor seal weeping has minimal effect during normal operation

B. Apply silicone sealer to the seal area to stop the weeping during the same service

C. Schedule seal replacement before the leak progresses to brake contamination conditions

D. Apply battery voltage to the seal area for diagnostic testing during the service

36. The most likely cause of a heavy-duty drive axle that shows ring gear tooth contact pattern shifted toward the toe after recent service is:

A. Insufficient pinion depth requiring thicker shims behind the pinion bearing race

B. Excessive carrier preload requiring shim removal during the service procedure

C. Insufficient backlash requiring carrier shim adjustment during the service

D. Worn pinion bearings allowing pinion deflection during operation conditions

37. The LEAST likely cause of a heavy-duty drive axle that shows accelerated wheel bearing wear is:

A. Improper torque application during recent wheel bearing service procedures

B. Contamination from failed wheel seal allowing dirt entry during operation

C. Excessive endplay or insufficient preload at the most recent service event

D. A failed coolant temperature sensor reading falsely cold to the engine ECM

38. The proper measurement procedure for heavy-duty drive axle ring gear runout is to:

A. Apply battery voltage to the ring gear for diagnostic testing during measurement

B. Mount a dial indicator on a fixed reference and rotate the ring gear slowly during measurement

C. Listen for runout-related noise with a stethoscope during operation conditions

D. Estimate runout visually using shop lighting during the inspection process

39. The most accurate description of heavy-duty drive axle differential lube level verification is:

A. Apply battery voltage to the differential housing for diagnostic testing during inspection

B. Check the dipstick markings during cold engine conditions before vehicle operation

C. Remove the fill plug and observe lubricant at the plug threshold per service information

D. Listen for lubricant flow with a stethoscope during normal operation conditions

40. The proper diagnostic approach when a heavy-duty drive axle complaint of "humming noise at highway speed" cannot be reproduced during shop testing is to:

A. Document operating conditions, perform extended road test, and isolate the noise source

B. Replace the drive axle assembly as preventive maintenance based on complaint history

C. Apply battery voltage to the drive axle for diagnostic testing during the same visit

D. Refuse the repair since the symptom cannot be verified during the shop diagnostic visit

ANSWER KEY AND EXPLANATIONS

DOMAIN A — CLUTCH

1. A — A clutch pedal that fell to the floor with an empty reservoir indicates a hydraulic leak somewhere in the system. The proper first action is to inspect the master cylinder, slave cylinder, and connecting lines to identify the leak source. Refilling without inspection allows the leak to continue, potentially causing repeat failure or dangerous operation if the truck is returned to service prematurely.

2. C — Hot-only release problems typically indicate thermal expansion in the hydraulic system: trapped air expands more than fluid as temperature rises, increasing pressure and changing pedal feel. Cold operation may be acceptable when air is compressed; hot operation reveals the problem as expanded air disrupts hydraulic transmission. A worn clutch disc would produce slip, not release problems.

3. B — Clutch slip diagnosis requires systematic verification of pedal free play (which affects release bearing retraction), internal adjustment (which affects clamping force), and clutch component condition (which affects friction coefficient). Each parameter must be verified to identify the specific cause; blanket replacement wastes labor and parts.

4. D — Three high-mileage units showing identical reverse engagement problems most likely share worn clutch brakes. Clutch brakes wear with each application; after 400,000 miles without service, brake material is typically worn beyond service limits. Pilot bearings, facing wear, and air contamination produce different symptoms not specific to reverse engagement from a stop.

5. C — Heavy-duty pull-type clutch internal adjustment uses an access hole in the clutch housing with the engine off and the parking brake set. The adjustment ring is rotated through this access hole to reposition the pressure plate fingers. Removal from the truck is unnecessary; external linkage adjustment is separate from internal adjustment.

6. A — The clutch brake stops the input shaft from rotating when the pedal is pushed fully to the floor, allowing engagement of starting gears (typically reverse and low) from a stop without grinding. The brake operates only at full pedal travel and only when the truck is stationary; using it during shifts in motion destroys the brake material rapidly.

7. D — ECT sensor errors affect engine fuel mixture but do not affect release bearing operation. The other choices all describe direct causes of release bearing failure: riding the pedal causes continuous loading, insufficient free play prevents retraction allowing continuous contact, and missing pivot lubrication causes binding that loads the bearing.

8. B — Slave cylinder operation is verified by observing pushrod movement when the clutch pedal is depressed. The pushrod should extend smoothly, fully, and return without binding or hesitation. Voltage application is irrelevant to hydraulic components; replacement without verification wastes labor.

9. C — Squeaking during pedal application typically originates from dry pivot points or linkage that lack adequate lubrication. The release fork pivot and external linkage points carry loads during every clutch operation; without lubrication, they produce the characteristic squeak. Bearings produce different noise patterns; worn facings do not produce squeak.

10. A — The master cylinder pushrod adjustment sets external pedal free play before the master cylinder primary seal engages. Proper adjustment ensures full pedal travel produces full slave cylinder stroke without bottoming the master cylinder. The pushrod adjustment affects external free play only; it does not affect clutch clamping force, brake timing, or disc thickness.

11. C — Customer complaints that cannot be reproduced require documentation of conditions when the symptom occurs, extended road test under those conditions, and component inspection. Some symptoms appear only under specific conditions (load, temperature, terrain) that cannot be replicated in the shop. Systematic investigation identifies actual causes that quick replacement would miss.

DOMAIN B — TRANSMISSION

12. D — Multiple sensor fault codes simultaneously suggest a common cause rather than multiple sensor failures. The proper priority is verifying J1939 data bus communication and inspecting common power/ground connections that all sensors share. Common cause investigation prevents unnecessary parts replacement and identifies the actual fault.

13. A — The J1939 data bus provides communication between engine ECM, TCM, and other vehicle modules during shifts. Engine torque requests, throttle position, vehicle speed, and other data flow across the bus to coordinate AMT operation. The bus is communication only; mechanical control comes from pneumatic and electric actuators commanded by the TCM.

14. B — Countershaft retaining nut torque values come from manufacturer service information specific to the transmission model. Visual estimation cannot achieve the precision required for proper bearing preload setup. Manufacturer specifications account for bolt grade, thread size, and component loads to ensure proper retention without component damage.

15. D — Rear yoke seal leakage requires seal replacement with inspection of the yoke surface that contacts the seal lip. A damaged yoke surface (galling, scoring, ring wear) damages new seals during installation, producing repeat failures. Surface inspection identifies whether yoke replacement is also required to prevent recurrence.

16. C — Installing a new seal without inspecting the yoke surface allows surface defects to damage the new seal lip during installation, producing premature failure. Yoke surfaces wear from

extended seal contact; ring grooves and galling concentrate force on the new seal lip, cutting it during installation or shortly after.

17. A — Countershaft endplay measurement uses a dial indicator at the countershaft end to measure axial movement during inspection. The indicator displays total movement when the shaft is pushed and pulled; the reading is compared to specification (typically 0.005 to 0.015 inches). Voltage application and visual estimation cannot quantify endplay accurately.

18. D — ECT sensor errors affect engine fuel mixture but do not directly cause AMT shift failures. The other choices all describe direct causes of failed upshifts: insufficient air pressure prevents actuator completion, failed shift rail sensor prevents confirmation, and TCM calibration issues affect shift logic decisions.

19. B — AMT clutch protection mode is an ECM-controlled function that limits clutch slipping to prevent overheating damage. When the system detects extended slipping (steep grade, heavy load, improper operation), the ECM commands full clutch engagement or vehicle slowdown to prevent the heat damage that destroys clutches. Manual control would defeat the protection.

20. C — Reusing transmission case bolts during rebuild requires thread inspection, replacement of damaged bolts, and torque to specification per service information. Damaged threads cannot maintain proper torque and may strip during installation. Anti-seize compound generally is not used on transmission case bolts because it changes torque-to-tension relationships.

21. B — Clicking during gear engagement that disappears when fully engaged indicates worn shift fork pads allowing partial engagement during the shift sequence. The fork moves the sliding clutch into engagement, but pad wear allows the sliding clutch to oscillate slightly until full engagement is achieved. The clicking is the engagement teeth catching during this transition.

22. D — Heavy-duty AMT clutch facing wear is monitored using scan tool data: clutch position sensor readings and TCM-calculated wear values indicate remaining facing thickness. The TCM tracks clutch position over engagement events, calculating wear based on position change. This eliminates the labor of physical clutch removal for measurement.

23. A — Heavy-duty manual transmissions use splash distribution from rotating gears throughout the case interior. The lower portion of gears rotates through the lubricant pool, throwing oil to bearings, gears, and shift components. This passive distribution method requires no pump and works reliably as long as proper lubricant level is maintained.

24. C — ECT sensor errors affect engine fuel mixture but do not produce transmission noise. The other choices all describe direct sources of humming with the clutch engaged: input shaft, countershaft, and output shaft bearings carry load whenever the engine drives the transmission, even in neutral. Bearing wear produces speed-related noise that varies with engine RPM.

DOMAIN C — DRIVESHAFT AND U-JOINTS

25. B — Highway-speed-only vibration requires complaint verification through road test, then systematic inspection of driveshaft components. Reproducing the symptom under actual operating conditions confirms the diagnosis path; inspection identifies the specific component (imbalance, U-joint wear, slip joint condition, operating angles) responsible. Blanket replacement wastes parts and labor.

26. D — Slip joint lubrication uses grease applied through a grease fitting at manufacturer-specified intervals. The grease maintains a film between the spline surfaces, preventing metal-to-metal contact that would cause galling and binding. Sealed slip joints exist on some applications but greaseable designs remain common on heavy-duty trucks.

27. A — Front and rear U-joint operating angles should differ by less than 1 degree for proper vibration cancellation. Equal angles allow the velocity fluctuations introduced by each joint to cancel each other through the driveshaft rotation. Differences of 5 to 10 degrees would produce severe torsional vibration and rapid component failure.

28. C — Galled slip joint splines indicate damage that compromises the spline operation; the slip joint or driveshaft assembly requires replacement per service information. Galling cannot be repaired effectively; continued operation produces progressive damage and eventual binding or seizure that could damage transmission output bearings or axle components.

29. D — RPM-specific vibration in highway operation indicates a resonance condition that occurs only at specific driveshaft speeds. The resonance amplifies imbalance, U-joint wear, or operating angle problems that may not produce vibration at other speeds. The symptom signature is unique to resonance phenomena where the system natural frequency matches operating frequency.

30. A — Worn U-joints in early stages of failure do not cause loss of vehicle steering control. The other choices all describe direct progression of U-joint failure: vibration increases progressively, adjacent components wear from the resulting forces, and continued operation leads to catastrophic failure. Steering system operation is independent of driveshaft U-joint condition.

31. B — Center support bearing inspection includes verification of bearing rotation (smooth and free), rubber isolation mount condition (no cracks, deterioration, or fatigue), and absence of binding or noise. All three conditions must be acceptable for the center support to function properly. Voltage application is irrelevant; preventive replacement without inspection wastes serviceable components.

DOMAIN D — DRIVE AXLE

32. A — Heel-side concentrated tooth contact pattern indicates the pinion is positioned too shallow, requiring increased pinion depth using thicker shims behind the pinion bearing race during service. The thicker shims move the pinion deeper into mesh with the ring gear, shifting the contact pattern toward the toe and centering it across the tooth face.

33. D — TMC RP 618 establishes industry-standard wheel bearing torque procedures for heavy-duty applications. The procedure includes specific tightening sequences, rotation requirements during torque, and final verification methods. Most manufacturers reference or follow RP 618 specifications, making it the industry-standard reference for heavy-duty wheel bearing service.

34. B — Drive axle fluid contamination exceeding service specification requires draining the contaminated fluid, inspecting for the contamination source (failed seals, water entry, metal wear), and refilling with proper fluid. Continued operation allows progressive damage from contamination; complete fluid replacement and source identification prevents recurrence.

35. C — Minor wheel seal weeping requires scheduled replacement before the leak progresses to brake contamination conditions. Weeping is the early stage of seal failure; allowing progression results in oil reaching brake friction surfaces, requiring complete brake friction component replacement. Early intervention saves the cost of major brake repair.

36. A — Toe-side tooth contact pattern shift indicates insufficient pinion depth, requiring thicker shims behind the pinion bearing race to move the pinion deeper into mesh. The thicker shims correct the depth, shifting the contact pattern back toward the center of the tooth face. Contact pattern direction guides the correction direction during pinion depth setup.

37. D — ECT sensor errors affect engine fuel mixture but do not affect wheel bearing wear. The other choices all describe direct causes of accelerated bearing wear: improper torque produces incorrect preload, contamination causes abrasive wear, and incorrect endplay or preload damages bearing surfaces. ECT is unrelated to wheel bearing operation.

38. B — Ring gear runout is measured by mounting a dial indicator on a fixed reference (typically the differential housing) and rotating the ring gear slowly while observing indicator readings. The difference between maximum and minimum readings indicates total runout. Excessive runout indicates carrier damage, improper installation, or ring gear damage requiring service.

39. C — Drive axle differential lube level is verified by removing the fill plug and observing lubricant at the plug threshold per service information. The fill plug is positioned at the proper level mark; if lubricant flows out or is at the plug threshold, level is correct. Dipsticks are not used on most heavy-duty drive axles.

40. A — Customer complaints that cannot be reproduced require documentation of operating conditions, extended road test under those conditions, and noise source isolation. Some drive axle symptoms appear only under specific load, speed, or terrain conditions. Systematic investigation identifies actual causes; preventive replacement wastes parts and may not address the actual problem.