



## (A3) Manual Drive Train and Axles Sample Questions and Answers

Answers to these questions are found beginning on page 4 of this document

1. Technician A says that too much clutch pedal free play can cause the clutch to shudder during rapid acceleration. Technician B says that too little clutch pedal free play can cause the clutch to slip. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
2. Two technicians are discussing a transmission that is difficult to shift into gear. Technician A says the clutch may not be fully releasing. Technician B says that the synchronizer rings (blocking rings) may be worn. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
3. Technician A says that the flywheel should be resurfaced whenever the clutch friction disc and pressure plate are replaced. Technician B says that it may be necessary to install a shim between the crankshaft and the flywheel if the flywheel is machined. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
4. A clutch engages close to the floor and will often not disengage. What is the most likely cause?
  - a. Worn clutch disc
  - b. Misadjusted clutch linkage
  - c. Weak pressure plate
  - d. Worn flywheel

5. Two technicians are discussing clutch linkage adjustment. Technician A says that most hydraulic clutches are self-adjusting and that no adjustment is needed. Technician B says that many cable-operated clutches are self-adjusting and that no adjustment is needed. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
6. The fluid level in the reservoir of a hydraulic clutch master cylinder was found to be low. Technician A says that DOT 3 brake fluid should be used to restore the level to the indicated mark. Technician B says that the clutch slave cylinder may be leaking. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B
  
7. A clutch is slipping. What could be the cause?
  - a. A weak pressure plate
  - b. An oil-soaked clutch disc
  - c. A sticking clutch cable
  - d. All of the above
  
8. A growling sound is heard when the engine is running and the transmission/transaxle is in neutral with the clutch engaged (foot off of the clutch pedal). The noise stops when the clutch pedal is depressed. What is the most likely cause?
  - a. A release (throw out) bearing
  - b. Lack of lubrication at the fork and pivot
  - c. An input shaft bearing
  - d. A pilot bearing
  
9. The clutch master cylinder was replaced and now the clutch pedal feels mushy and the transmission cannot be shifted in gear. Technician A says that the slave cylinder may have to be removed from the bell housing and positioned so that all of the trapped air can be properly bled from the system. Technician B says the clutch itself should be replaced. Which technician is correct?
  - a. Technician A only
  - b. Technician B only
  - c. Both Technicians A and B
  - d. Neither Technician A nor B

10. A manual transmission is difficult to shift into all gears but only when the outside temperature is below freezing (32°F or 0°C). Technician A says that the brass blocking ring could be defective. Technician B says that incorrect gear lubricant could be the cause. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
11. Technician A says that the clearance between the synchronizer ring (blocking ring) and the speed gear should be measured with a feeler (thickness) gauge. Technician B says that a worn synchronizer ring (blocking ring) can cause gear clash when shifting. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
12. A five-speed manual transaxle is noisy in all gears. Which is the least likely cause?
- A pilot bearing
  - An input shaft bearing
  - An output shaft bearing
  - Final drive side (differential) bearings
13. Two technicians are discussing U-joints. Technician A says that a defective U-joint could cause a loud “clunk” noise when the transmission is shifted between drive and reverse. Technician B says a worn U-joint can cause a clicking or squeaking sound when driving the vehicle in reverse, but not while moving forward. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B
14. The last step before installing the drive axle shaft into the vehicle after replacing the CV joint boot is to \_\_\_\_\_.
- “Burp the boot” and tighten the clamp
  - Lubricate the CV joint with chassis grease
  - Mark the location of the boot on the drive axle shaft
  - Separate the CV joint before installation
15. A growling sound is heard from the rear of a rear-wheel-drive vehicle while turning left only. Technician A says that defective rear axle bearings may be the cause. Technician B says that defective side bearings may be the cause. Which technician is correct?
- Technician A only
  - Technician B only
  - Both Technicians A and B
  - Neither Technician A nor B

## Answers to Sample Questions

- 1. The correct answer is b.** Technician B is correct because a lack of free play at the clutch pedal causing the clutch to slip because it could be partially released. Technician A is not correct because excessive clutch pedal free play will not cause the clutch to shudder because while it may not fully disengage making shifting difficult, a shudder is usually caused by a fault with the clutch disc causing it to grab and release causing the shudder. Answers c and d are not correct because only Technician B is correct.
- 2. The correct answer is c.** Both technicians are correct. Technician A is correct because if the clutch is not being fully released, shifting will be difficult because engine torque is being applied to the transmission. Technician B is correct because worn synchronizer rings will often not be able to slow the faster gear enough to enable a smooth, easy shift to occur. Answers a, b, and d are not correct because both technicians are correct.
- 3. The correct answer is c.** Both technicians are correct. Technician A is correct because most vehicle manufacturers recommend that the flywheel be resurfaced whenever a clutch is replaced to make certain that the new friction disc will have the proper surface finish for best performance. Technician B is correct because when material is removed from the surface of the flywheel, the geometry of the release fork and release (throw out) bearing is changed. A shim equal in thickness to the amount of material removed from the flywheel should be installed between the crankshaft and the flywheel to restore the proper clutch component geometry. Answers a, b, and d are not correct because both technicians are correct.
- 4. The correct answer is b.** A misadjusted clutch linkage is the most likely cause of the clutch engaging too close to the floor and not disengaging fully at times. Less free play would allow the clutch to operate as designed. Answer a is not correct because as a clutch disc wears, the free play is decreased (not increased) making it unlikely to cause the problem of engagement too close to the floor. Answers c and d are not correct because a weak pressure plate or a worn flywheel could cause the clutch to slip but will not cause the clutch to grab too close to the floor.
- 5. The correct answer is c.** Both technicians are correct. Technician A is correct because the fluid in the hydraulic clutch assembly is able to provide the same travel as the clutch disc wears. Technician B is correct because many cable-operated clutches have mechanical mechanisms that ratchet and readjust the clutch linkage when the clutch disc wears. (Some clutches are designed so that the clutch pedal has to be pulled upward to adjust.) Answers a, b, and d are not correct because both technicians are correct.
- 6. The correct answer is c.** Both technicians are correct. Technician A is correct because most hydraulic clutch systems are designed to use DOT 3 brake fluid. Technician B is correct because a leak anywhere in the system will cause the fluid level to drop in the hydraulic clutch master cylinder reservoir. Answers a, b, and d are not correct because both technicians are correct.
- 7. The correct answer is d.** All of the above are correct. A weak pressure plate (answer a) can cause the clutch to slip as well as an oil-soaked clutch (friction) disc (answer b), and a sticking clutch cable (answer c), which could prevent the clutch from fully engaging.

8. **The correct answer is c.** An input shaft bearing will usually make a growling sound when the clutch pedal is up and the engine is running. Answer a is not correct because a release (throw out) bearing will usually make noise when the clutch pedal is being depressed rather than when the clutch pedal is up. Answer b is not correct because a squeaking sound (not a growling sound) is often heard at the clutch fork and pivot points with the engine running and the clutch engaged (clutch pedal up) if the pivot points are not lubricated. Answer d is not correct because a pilot bearing will cause a squealing sound as the clutch pedal is being depressed.
9. **The correct answer is a.** Technician A is correct because air can be trapped in the slave cylinder making it very difficult to bleed all of the air out of the hydraulic clutch system unless it is repositioned to allow the air to escape. Answer b is not correct because even though the clutch may need to be replaced, the most common problem is air trapped in the system when the clutch master cylinder was replaced.
10. **The correct answer is b.** Technician B is correct because too thick a lubricant can cause difficult shifting into all gears especially when cold. Technician A is not correct because a worn brass blocking-ring, while it could cause difficult shifting, would not cause a shifting problem in all gears, but rather just the gear that uses the worn blocking ring. Answers c and d are not correct because Technician B only is correct.
11. **The correct answer is c.** Both technicians are correct. Technician A is correct because a feeler gauge is used to measure how far the ring travels up onto the ramp of the speed gear. If the measurement is less than specified, the blocking ring should be replaced. Technician B is correct because the blocking ring forces the speed gear to rotate at the same speed as the previous gear thereby allowing a smooth shift. If the blocking ring is worn, a gear clash can result when shifting. Answers a, b, and d are not correct because both technicians are correct.
12. **The correct answer is a.** A defective pilot bearing is the least likely to cause noise in all gears because most transaxles do not use a pilot bearing and if it did, it would make a squealing noise that changes when the clutch is depressed and not in every gear as the vehicle is being driven. Answers b, c, and d are not correct because all of the bearings could be the cause of excessive noise in all gears if defective.
13. **The correct answer is c.** Both technicians are correct. Technician A is correct because a worn U-joint can make a clunk sound when the excessive clearance is taken up when the transmission is shifted to drive or reverse or from reverse to drive. Technician B is correct because a worn U-joint would often make a squeaking sound in reverse because the rollers are being moved in a direction which is opposite where most of the wear has occurred. Answers a, b, and d are not correct because both technicians are correct.
14. **The correct answer is a.** The last step before installing the drive axle shaft into the vehicle after replacing the CV joint boot is to burp out any trapped air from within the boot and then tighten the retaining clamp. Answer b is not correct because chassis grease should not be used to lubricate CV joints. Answers c and d are not correct because these operations should be performed during disassembly and not reassembly.
15. **The correct answer is a.** Technician A is correct because as a vehicle turns a corner, vehicle weight is shifted placing a greater load on the axle bearing on the right side as the vehicle turns to the left. Technician B is not correct because side bearings are close to the center of the vehicle and do not support the weight of the vehicle and therefore would not be likely to be affected during cornering. Answers c and d are not correct because Technician A only is correct.