(A6) Electrical/Electronic Systems Sample Questions and Answers

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

1. Why is it important to verify the reported electrical symptom?

   a. The problem may be intermittent
   b. There may be related symptoms not reported by the customer
   c. The service advisor may have misunderstood the problem
   d. All of the above are correct

2. Technician A says that a low or zero reading on an ohmmeter indicates continuity. Technician B says that an ohmmeter set on the highest scale and reading infinity means no continuity. Which technician is correct?

   a. Technician A only
   b. Technician B only
   c. Both Technician A and B
   d. Neither Technician A nor B

3. A circuit that has a relay does not work but the relay can be heard to click when activated. Technician A says the coil of the relay could be open. Technician B says that the coil of the relay could be shorted. 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 convertible top will not operate either up or down. The relay(s) does not click when the switch is depressed. Technician A says that the switch could be defective. Technician B says that the electric pump motor for the power convertible top could be defective and not cause the relays to click when the switch is moved. Which technician is correct?

   a. Technician A only
   b. Technician B only
   c. Both Technicians A and B
   d. Neither Technician A nor B

5. A relay is being checked out of the vehicle using a DMM. Technician A says that the coil winding can be checked by selecting the DC volt setting. Technician B says that the coil should measure OL on the meter if the relay is okay. 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. Technician A says that a shorted diode in an alternator can discharge a battery. Technician B says that dirt on the battery can cause it to discharge. 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. Normal key-off battery drain (parasitic draw) on a vehicle with many computer and electronic circuits is _____.

   a. 20 - 30 milliamperes
   b. 2 - 3 amperes
   c. 0.20 to 0.40 A
   d. 150 to 300 milliamperes

8. Technician A says that a battery should not be stored on a concrete floor. Technician B says that a battery will not be able to be fully charged if placed on a concrete floor when being charged. Which technician is correct?

   a. Technician A only
   b. Technician B only
   c. Both Technicians A and B
   d. Neither Technician A nor B

9. A starter cranks for a while, then whines. Technician A says that the starter solenoid may be bad. Technician B says that the starter drive may be bad. 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. All of the following could be a cause of excessive starter ampere draw except _____.

    a. A misadjusted starter pinion gear
    b. A loose starter housing
    c. Armature wires separated from the commutator
    d. A bent armature

11. A starter makes a grinding noise. Which is the least likely cause?

    a. A defective starter drive
    b. A defective flywheel
    c. Incorrect distance between the starter pinion and the flywheel
    d. Worn starter brushes

12. An acceptable charging circuit voltage on a 12-volt system is _____.

    a. 13.5 to 15.0 volts
    b. 12.6 to 15.6 volts
    c. 12 to 14 volts
    d. 14.9 to 16.1 volts

13. An alternator overrunning pulley (AOP) is being tested with the accessory drive belt removed. It is functioning correctly if_____.

    a. The pulley rotates freely in only one direction
    b. The pulley is locked in both directions
    c. The pulley is free to rotate in both directions
    d. Either b or c

14. The high beam indicator on the dash does not come on but both headlight beams work. Technician A says that the indicator bulb could be defective. Technician B says the dimmer switch could be defective. Which technician is correct?

    a. Technician A only
    b. Technician B only
    c. Both Technicians A and B
    d. Neither Technician A nor B

15. A vehicle's reverse lights are always on, even in "drive." What is the most likely cause?

    a. A misadjusted neutral safety switch
    b. An open neutral safety switch
    c. One of the reverse light bulbs has been installed backward
    d. The wrong bulb was installed for the reverse lights

Answers to Sample Questions

1. **The correct answer is d.** All of the above are correct. Answer a is correct because the customer concerns could be occurring on and off. Answer b is correct because there may be other faults that the customer is not aware of that could have an effect on the electrical fault. Answer c is correct because verbal communication and terminology could be misinterpreted by the customer and/or the service advisor.

2. **The correct answer is c.** Both technicians are correct. Technician A is correct because if the ohmmeter display shows zero or low ohms, this means that there is little if any resistance between the meter leads. The component being tested has continuity and current will flow if connected to an electrical power source. Technician B is correct because an infinity reading, such as "OL" on the display, means that there is such a high resistance between the meter leads that the meter is unable to measure on the highest setting. In other words, the component being measured lacks continuity and no current will flow if connected to an electrical power source. Answer d is not correct because both technicians are correct.

3. **The correct answer is d.** Neither technician is correct. Technician A is not correct because the relay could not click if the coil winding, which creates the magnetic field needed to move the armature (movable contact) of the relay, were open. Technician B is not correct because a shorted relay coil could not create a magnetic field strong enough to cause the relay to click. Answers a, b, and c are not correct because neither technician is correct.

4. **The correct answer is a.** Technician A is correct because if the relay does not click, there is a fault in the control circuit that operates the coil of the relay and a defective switch could be the cause. Technician B is not correct because the relays do not operate to send electrical power to the motor. While the motor(s) could be defective, the fault is in the control circuit because the relay(s) does not click when the switch is moved. Answers c and d are not correct because Technician A only is correct.

5. **The correct answer is d.** Neither technician is correct. Technician A is not correct because a coil of a relay, out of the vehicle, cannot be checked for voltage drop using DC volt scale because there is no applied voltage. Technician B is not correct because the relay coil should measure between 60 and 100 ohms for most relays and should not read OL (open circuit or over limit in the motor). Answers a, b, and c are not correct because neither technician is correct.

6. **The correct answer is c.** Both technicians are correct. Technician A is correct because a diode should block the flow of electricity from the battery into the alternator and if a diode were shorted, current would be drained from the battery. Technician B is correct because dirt combined with moisture in the air can cause some electric current to flow between the terminal posts of the battery. Answers a, b, and d are not correct because both technicians are correct.

7. **The correct answer is a.** It is normal for a vehicle to have a normal key-off battery drain of 20 to 30 mA (0.02 to 0.03 A). Answer b (2 to 3 amperes), answer c (0.2 to 0.4 A), and answer d (150 to 300 mA) are not correct because they are all much higher than the maximum allowable specification of 50 mA (0.05 A) as stated by most vehicle manufacturers.

8. **The correct answer is a.** Technician A only is correct because while the battery cannot discharge through the plastic case, the concrete is cold and damp. If a battery is stored on concrete, the difference in temperature between the top and bottom of the cells causes the battery to self-discharge. All batteries should be stored in cool dry locations. Technician B is not correct because even though a battery may self-discharge if stored on concrete, it can be charged on concrete as long as it does not remain on the concrete floor in storage after it has been fully charged. Answers c and d are not correct because Technician A only is correct.

9. **The correct answer is b.** Technician B is correct because a worn starter drive will cause the starter motor to spin and not rotate the engine flywheel. Technician A is not correct because if the starter is rotating, the solenoid has to be working because the drive pinion is forced to mesh with the flywheel before current flows through the solenoid to the starter motor. Answers c and d are not correct because Technician B only is correct.

10. **The correct answer is c.** If wires were separated from the commutator of the starter armature, an open circuit would result and little if any current would flow through the starter. Answer a (misadjusted starter pinion gear) could cause the starter to drag and draw excessive current if the clearance between the flywheel and the pinion were too close. Answer b (loose starter housing) could cause excessive starter current draw if the armature becomes bound due to the misalignment of the armature bushings (bearings). Answer d (bent armature) could cause excessive starter current draw when the armature rubs against the field coils when it rotates.

11. **The correct answer is d.** Worn starter brushes could affect the operation of the starter but are not as likely to cause a grinding sound. Answer a (starter drive) is not correct because a defective drive or pinion gear on the drive could cause a grinding sound. Answer b (flywheel) is not correct because if the teeth are excessively worn or damaged, they can cause a grinding sound. Answer c (pinion to flywheel clearance) is not correct because if the clearance is not within specifications, a whine or grinding sound could be heard during cranking.

12. **The correct answer is a.** The charging system voltage should be within 13.5 to 15.0 volts according to most vehicle manufacturer's specifications. Answer b is not correct because 12.6 volts is too low and 15.6 volts is too high and could damage the battery. Answer c is not correct because 12 volts is too low a voltage to adequately charge the battery. Answer d is not correct because the voltage is too high and could damage the battery and some electrical devices in the vehicle.

13. **The correct answer is a.** An alternator overrunning pulley uses a one-way roller clutch that allows the pulley to freely rotate in only one direction if working as designed. Answers a, b, and c are not correct because they do not indicate the proper operation for a good alternator overrunning pulley.

14. **The correct answer is a.** Technician A only is correct because the bulb will not light if it is burned out and yet the high beam will function correctly. Technician B is not correct because the high beam functions correctly, which indicates that the dimmer switch is able to switch to the high beam position. Answers c and d are not correct because Technician A only is correct.

15. **The correct answer is a**. A misadjusted neutral safety switch is the most likely cause of the backup lights remaining on all the time. Most neutral safety switches contain contacts that close when the gear selector is in reverse to send current to the backup (reverse) lights. Answer b is not correct because an open switch means that no current will flow through the switch. Answers c and d are not correct because even if the bulb were installed backward, the lights would not remain on because the power comes from the neutral safety switch.