**CDX Distance Learning**

**Exercise #31**

**Advanced Starter Circuit Diagnosis**

**Student Name:** Click or tap here to enter text.

Click or tap the check box next to the answer choice that best completes the statement or answers the question. Viewing the animations will be required to answer the following questions correctly. Read the question and use the link provided in each section to open the animation. Follow the directions in the questions and select the correct answer. When complete, close the animation window and move on to the next question(s).

[**Starter Animation 8**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss08_C1/EE_StartTstAss08_C1/EE_StartTstAss08_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3. Is the current draw of the starter within specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4. Is battery voltage available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5. Is there ground available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 6. Is there voltage available from the starter solenoid to the starter motor?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 7. Is there continuity between the starter motor and the motor housing?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The starter motor is faulty |
|  [ ]  | b.  | The ignition switch is faulty |
|  [ ]  | c.  | The starter motor solenoid is faulty |
|  [ ]  | d.  | The starter pull in coil is faulty |

 |

[**Starter Animation 9**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss09_C1/EE_StartTstAss09_C1/EE_StartTstAss09_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 9. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 10. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 12. Is the current draw of the starter within specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 13. Is battery voltage available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 14. Is there ground available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 15. Is there correct voltage available from the starter solenoid to the starter motor?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16. What is the voltage drop, if any across the starter solenoid?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 200 A |
|  [ ]  | b.  | 20 V |
|  [ ]  | c.  | 2 A |
|  [ ]  | d.  | 2 V |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The battery has failed |
|  [ ]  | b.  | The starter motor solenoid is faulty |
|  [ ]  | c.  | The starter motor is faulty |
|  [ ]  | d.  | The ignition switch is faulty |

 |

[**Starter Animation 10**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss10_C1/EE_StartTstAss10_C1/EE_StartTstAss10_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 18. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 19. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 20. Is the current draw of the starter within specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 21. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 22. Is battery voltage available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 23. Is battery voltage available at the starter while cranking?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24. What is the voltage drop, across the positive cable from the battery to the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 12.6 V |
|  [ ]  | b.  | 2 A |
|  [ ]  | c.  | 2 V |
|  [ ]  | d.  | 200 A |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The battery has failed |
|  [ ]  | b.  | The positive cable is faulty |
|  [ ]  | c.  | The ignition switch is faulty |
|  [ ]  | d.  | The starter motor is faulty |

 |

[**Starter Animation 11**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss11_C1/EE_StartTstAss11_C1/EE_StartTstAss11_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 26. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 27. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 28. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
| [ ]   | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 29. Is the current draw of the starter within specifications?

|  |  |  |
| --- | --- | --- |
| [ ]   | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 30. Is battery voltage available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 31. Is battery voltage available at the starter while cranking?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|   | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 32. Is there ground available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 33. What is the voltage drop, across the negative cable from the battery to the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 0 V |
|  [ ]  | b.  | 0.5 V |
|  [ ]  | c.  | 11.9 V |
|  [ ]  | d.  | 12.6 V |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 34. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The battery has failed |
|  [ ]  | b.  | The positive cable is faulty |
|  [ ]  | c.  | The negative cable is faulty |
|  [ ]  | d.  | The starter motor is faulty |

 |

[**Starter Animation 12**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss12_C1/EE_StartTstAss12_C1/EE_StartTstAss12_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 35. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 36. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 37. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 38. Is the current draw of the starter within specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 39. What is the current draw of the starter when cranking with the starter installed?

|  |  |  |
| --- | --- | --- |
| [ ]   | a.  | 10.1 V |
|  [ ]  | b.  | 10.1 A |
|  [ ]  | c.  | 380 V |
|  [ ]  | d.  | 380 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 40. Is the amperage draw with the starter installed within the loaded specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 41. What is the current draw of the starter while cranking when the starter is removed and bench tested?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 11.6 A |
|  [ ]  | b.  | 11.6 V |
|  [ ]  | c.  | 125 A |
|  [ ]  | d.  | 380 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 42. Is the amperage draw with the starter removed within the no load specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 43. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The battery has failed |
|  [ ]  | b.  | The positive cable is faulty |
|  [ ]  | c.  | The negative cable is faulty |
|  [ ]  | d.  | The starter motor is faulty |

 |

[**Starter Animation 13**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss13_C1/EE_StartTstAss13_C1/EE_StartTstAss13_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 44. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 45. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 46. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 47. Is the starter’s current draw within specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 48. What is the starter’s current draw when cranking with the starter installed?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 10.1 V |
|  [ ]  | b.  | 12.6 V |
|  [ ]  | c.  | 380 A |
|  [ ]  | d.  | 59 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 49. Is the amperage draw within the loaded specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 50. What is the current draw of the starter when cranking when the starter is removed and bench tested

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 11.8 V |
|  [ ]  | b.  | 12.6 V |
|  [ ]  | c.  | 380 A |
|  [ ]  | d.  | 59 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 51. Is the amperage draw within the no load specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 52. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The engine has failed |
|  [ ]  | b.  | The starter motor is faulty |
|  [ ]  | c.  | The starter motor solenoid is faulty |
|  [ ]  | d.  | The battery has failed |

 |

[**Starter Animation 14**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss14_C1/EE_StartTstAss14_C1/EE_StartTstAss14_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 53. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 54. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 55. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |
| 56. What is the current draw of the starter when cranking with the starter installed?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 59 V |
|  [ ]  | b.  | 59 A |
|  [ ]  | c.  | 12.6 V |
|  [ ]  | d.  | 12.6 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 57. Is the amperage draw within the loaded specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 58. What is the current draw of the starter when cranking when the starter is removed and bench tested?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | 59 V |
|  [ ]  | b.  | 59 A |
|  [ ]  | c.  | 12.6 V |
|  [ ]  | d.  | 12.6 A |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 59. Is the amperage draw within the no load specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The ignition switch is faulty |
|  [ ]  | b.  | The park/neutral switch is faulty |
|  [ ]  | c.  | The starter motor is faulty |
|  [ ]  | d.  | The engine is faulty |

 |

[**Starter Animation 15**](http://d2jw81rkebrcvk.cloudfront.net/assetscdx2/202003%20-%20COVID/Assessments/MS/ANIM/EE/EE_StartTstAss15_C1/EE_StartTstAss15_C1/EE_StartTstAss15_C1.html)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 61. Does the starter operate when the ignition is moved to the start position?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 62. Is the starter properly operating?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 63. Is the battery fully charged?

|  |  |  |
| --- | --- | --- |
| [ ]   | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 64. Is the amperage draw within the loaded specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 65. Is the amperage draw within the no load specifications?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 66. Is battery voltage available at the starter?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 67. Is battery voltage available at the starter while cranking?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | Yes |
|  [ ]  | b.  | No |

 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 68. What is most likely the issue with the starter system?

|  |  |  |
| --- | --- | --- |
|  [ ]  | a.  | The battery has failed |
|  [ ]  | b.  | The ignition switch is faulty |
|  [ ]  | c.  | The positive cable is faulty |
|  [ ]  | d.  | The starter motor solenoid is faulty |

 |