ROADMASTER DRIVERS SCHOOL

STUDY GUIDE FOR THE COMMERCIAL DRIVER'S LICENSE

INTRODUCTION

COMMERCIAL DRIVER LICENSE (CDL) ENDORSEMENT EXAM

AIR BRAKES

SUPPORTING	COMMERCIAL DRIVER LICENSE MANUAL VERSION 2.0
TEXT	SECTION 5
PUBLISHER:	YOU'RE STATE DEPARTMENT OF DRIVER LICENSING

STUDY GUIDE USE INFORMATION

This Study Guide is designed to help you learn and understand the information necessary to successfully pass the CDL endorsement exam, **AIR BRAKES**. All persons seeking any class commercial License driving equipment that is equipped with air brakes must take this written test. Refer to the Commercial Driver License Manual to help you understand the correct information. Each section is referenced in the practice test questions where you can find the correct information.

The study guide consists of 3 major parts. 1. **Key facts you need to know to pass the written test**. 2. **Two practice tests to measure your knowledge of the subject**. 3. **Answer sheets for the practice tests.**

Study all key facts in the study guide. This is the information you need to know to pass the test. When you feel you have read and understood the key facts, take the first practice test without using the answer sheet. Self grade your practice test. Re-study the key facts that relate to the questions you missed. Take the second practice test without using the answer sheet. Self-grade your second practice test. If you missed 3 or less, you are ready to challenge the CDL **Air Brakes** written Test.

When you believe you have adequately mastered this subject and the other two written endorsement tests required for a **Class A CDL**, you will demonstrate your knowledge by taking the CDL tests at your local Department of licensing. Your representative will give you directions.

Roadmaster Drivers School has no relationship with the testing facility. You must pass the **General Knowledge, Air Brakes and combination vehicles** test in order to receive a CDL Class A Permit. Once you have the Class A CDL permit, you will be qualified to attend the Skills portion of the Truck Driver Course.

AIR BRAKES STUDY GUIDE.

KEY FACTS YOU NEED TO KNOW TO PASS THIS TEST.

Study these key facts until you are confident you know the information. Most of these facts are common sense and some apply to your every day driving habits. More detailed information can be found in your Commercial Drivers License Manual in Section 5.

1. Air brakes use compressed air to make the brakes work.
2. Air brakes are made up of 3 different braking systems: Service brake, parking brake and emergency brake
3. The air compressor pumps air into the storage tanks.
4. The air compressor is connected to the engine and is either belt or gear driven.
5. The air compressor governor controls when air is pumped into the storage tanks.
6. The air storage tanks will hold enough air to operate the brakes several times if the compressor quits working.
7. If the compressor should develop a leak the one-way check valve prevents air from leaking from the tanks.
8. Water and oil brought into the air system is trapped by automatic water ejection devices or collected in the first air tank and is pumped into what is called the “wet tank”.
9. If you do not have automatic tank drains you should drain the water and oil from the compressed air storage tanks at the end of each day of driving.
10. Water in the air system can freeze in cold weather and cause brake failure.
11. If you vehicle is equipped with an alcohol evaporator you should check and refill it every day during cold weather.
12. If your vehicle has an alcohol evaporator, it is there to reduce the risk of ice in the air brake system.
13. A safety valve is set in the first tank the compressor pumps air into and it is usually set to open at 150 lbs.
14. All air brake equipped vehicles are required to have a separate supply gauge for each brake system.
15. The supply pressure gauge shows the driver how much pressure is in the tanks.
16. The driver must be able to see a warning that is given before the air pressure in the air storage tanks fall below 60 lbs. psi (one half the governed air pressure).
17. The most important thing to do when a low air pressure warning comes on is to stop and safely park as soon as possible.
18. Modern air brake systems combine three different systems: the SERVICE, PARKING and EMERGENCY BRAKE systems.
19. The brake system that applies and releases the brakes when the driver uses the brake pedal is the service brake system.

20. The brake pedal in air brake system controls the air pressure applied to put on the brakes of the vehicle.
21. Parking and emergency brakes of large vehicles equipped with air brakes can be held on by spring pressure.
22. The parking brake must hold the vehicle on any grade that the vehicle is operated on, that is free of ice and snow.
23. The braking power of the spring brakes depends upon the adjustment and condition of the service brakes.
24. Air brakes convert air pressure into mechanical force with air chambers, push rods and levers.
25. Foundation brakes are the mechanical parts of the brakes found on each end of the axles. Brake drums shoes and linings, and springs are part of the foundation brakes.
26. There are three types of foundation brakes used on large vehicles. They are s-cam, wedge and Disc brakes.
27. The most common type of foundation brake is the s-cam.
28. Trucks, busses and trailers (manufactured since 1975) are required to have a dual (two) air supply system. These are called the primary and secondary system. Each has its own supply pressure gauge and low air warning system.
29. Trucks, busses and trailers (manufactured since 1975) are required to have spring brakes to be used for parking and emergency brakes.
30. During normal driving, spring brakes are held back by air pressure.
31. In air break vehicles; the parking brake should be used whenever the vehicle is parked.
32. Spring brakes are applied automatically when the air supply pressure falls between 20 and 40 lbs. PSI, or manually by closing (pulling out on) the air supply valve on the dash. (yellow Valve)
33. Truck tractors are equipped with automatic tractor protection valve. (red valve)
34. The purpose of the tractor protection valve is to protect the tractors air supply.
35. Truck Tractors with air brakes built on or after March 1 1997 are required to be equipped with antilock brakes. (ABS)
36. Vehicles with ABS have yellow malfunction lamps to tell you if something is not working.
37. Tractors, Trucks, Busses will have a yellow ABS malfunction lamp on the instrument panel
38. Trailers equipped with ABS will have a yellow ABS malfunction lamp on the left side either on the front or rear corner.

39. ABS is an addition to your normal brakes. It does not decrease or increase your normal braking capability.
40. ABS only activates when wheels are about to lock up.
41. ABS helps the driver keep the vehicle under control during hard braking.
42. If your truck or bus is equipped with dual parking control valves, it means that you can use pressure from separate tank to release the spring brakes to move the vehicle a short distance.
43. On vehicles equipped with air brakes, the brake lights are activated by air pressure from the service brakes.
44. Many vehicles equipped with air brakes have automatic limiting valves to reduce braking power to the front wheels during normal braking; Front brakes receive full pressure when braking hard.
45. To check the free play of manual slack adjusters of an s-cam brake system, you should park on level ground. Chock-block the wheels and release the parking brakes.
46. When checking slack adjusters, they need to be adjusted if you can pull them out more than one inch.
47. Air leakage rate should be checked during pre-trip inspection.

    For a straight truck or bus, with the engine off.

    Brakes off – 2 lbs. per minute

    Brakes on – 3 lbs. per minute

    For combination vehicles (tractors and trailers) engine off.

    Brakes off – 3 lbs. per minute.

    Brakes on – 4 lbs. per minute.
48. When inspecting the air brake system you should check: air compressor, slack adjuster free-play, drums, linings, air hoses, low pressure warnings emergency brake activation, pressure build up rate, compressor cut-in and cut-out pressures, parking brakes and service brakes.
49. Total stopping distance for vehicles equipped with air brakes, perception distance + reaction distance + brake lag distance = braking distance.
50. Brake lag distance is the distance traveled while the service brake chamber fills with air pressure.
51. Total stopping distance for air brakes is longer than for hydraulic brakes due to “brake lag” distance.

52. Some air brake equipped vehicles have an air application gauge in addition to the air supply gauge. The air application gauge is not required.
53. The air application gauge shows how much pressure you are applying to the brakes.
54. You should know that your brakes are fading when you have to push harder on the brake pedal to control your speed on a downhill grade.
55. If you must make an emergency stop, you should brake so that you stay in a straight line and can steer.
56. To make an emergency stop with air brakes using the stab-braking method, you should brake as hard as you can, get off the brakes when the wheels lock up, get back on the brakes when the wheels start rolling again.
57. Never use the trailer hand valve to slow or stop the vehicle.
58. The trailer hand valve should be used ONLY to test the trailer brakes.
59. If you are driving down the road and have a major leak in your service (blue) air line, you are not likely to notice anything at all until you try to use the brakes to stop.

INSTRUCTIONS

NOW THAT YOU KNOW ALL THE KEY FACTS IN SECTION 5, TAKE THE PRACTICE TEST NUMBER 1 WITHOUT REFERRING TO THE ANSWER SHEET. SELF-GRADE YOUR TEST AND RE-STUDY THE MISSED QUESTIONS. (That is if you have any missed questions) YOU MAY WANT TO PUT YOUR ANSWERS ON A SEPARATE SHEET OF PAPER SO YOU CAN TAKE THE TEST MORE THAN ONCE. IF YOU DON'T UNDERSTAND THE QUESTION, GO TO YOUR CDL MANUAL AND REVIEW THE SECTION THAT IS REFERENCED AT EACH QUESTION. YOU CAN FIND THE CORRECT INFORMATION IN THE REFERENCED SECTION.

AIR BRAKES

PRACTICE TEST # 1

Read each question and all the answers carefully. Select the most correct answer. After answering all questions in the practice test, check them with the answer sheet for correctness. You can also check your answers for correctness by reading the Commercial Drivers License Manual, section 5. The questions listed are only similar to the ones that you can expect to find on the actual CDL written test. By studying this guide, you will be able to determine the most correct answer when you take the CDL written Air Brake Test.

When taking the CDL written test, follow these basic test-taking rules:

1. **Read the entire question and all answers before selecting your answer. Remember there maybe more than one right answer and you need to select the most correct answer.**
2. **Do not read words into the questions that are not there.**
3. **Watch for words that may change the meaning of the question, i.e. (NOT, EXCEPT, etc.)**
4. **Follow all instructions, oral or written.**

SECTION 5 – AIR BRAKES

1. The air compressor governor controls: (5.1)

   A. The rpm's of the air compressor.
   B Whether the compressor is on or off.
   C. Air pressure applied to the brakes.
   D. When the compressor will pump air into the storage tanks.

2. Which brake system applies and releases the brakes when the driver uses the brake pedal? (5.1)

   A. The emergency brake system.
   B. The service brake system.
   C. The parking brake system.
   D. None of the above.

3. When a failure occurs in the service brake system, the system you need to stop the vehicle is the? (5.1)

   A. Parking brake system.
   B. The emergency brake system
   C. Drum brake system
   D. The hand brake system

4. Three different systems are found on modern air brake systems, service brakes, the parking brake, and the: (5.1)

   A. Emergency brakes.
   B. Foot brakes.
   C. S-cam brakes.
   D. Drum brakes.

5. If your vehicle has an alcohol evaporator, it is there to? (5.1.5)

   A. Get rid of alcohol that condenses in the air tanks.
   B. Let the driver skip daily tank draining.
   C. Increase tank pressure the way superchargers boost engines.
   D. Reduces the risk of ice in the air brake valves in cold weather.

6. Oil and water usually collect in compressed air tanks. If you do not have automatic tank drains, when should you drain the air tanks? (5.1.4)

   A. After 4 hours of service.
   B. After every working day.
   C. Once a week.
   D. Every other week.

7. The brake pedal: (5.1.7)

   A. Is the main lever in the system?
   B. Can be a footrest during normal driving.
   C. Controls the air pressure applied to operate the service brakes.
   D. Exerts force on the slack adjusters by rods and connectors.

8. If your vehicle is equipped with an alcohol evaporator, every day during cold weather, you should? (5.1.5)

   A. Check and fill the alcohol level.
   B. Change the alcohol from a new bottle.
   C. Oil the system with 5-weight oil.
   D. Drain out the alcohol, which has accumulated.

9. Which of the following is okay to find in the air brake system? (5.1.4)

   A. Oil.
   B. Air.
   C. Water.
   E. All of the above

10. Why drain water from compressed air tanks? (5.1.4)

    A. The low boiling point of water reduces braking power.
    B. Water can freeze in cold weather and cause brake failure.
    C. Water overcools the compressor.
    D. To keep from fouling the air compressor.

11. The most common type of foundation brake found on heavy commercial vehicles is: (5.1.8)

    A. Disc.
    B. Wedge and drum.
    C. S-cam drum.
    D. None of the above.

12. The air supply pressure gauge shows the driver how much pressure: (5.1.14)

    A. Has been used on this trip.
    B. Is available in the air tanks.
    C. Is being sent to the brake chambers.
    D. None of the above.

13. When using the parking brake or emergency brake, what type of pressure is being used: (5.1.15)

    A. Fluid pressure.
    B. Spring pressure.
    C. Air pressure.
    D. Any of the above.

14. Air brake equipped vehicles must have: (5.1.15)

    A. At least three air tanks.
    B. A hydraulic braking system in case the air system fails.
    C. An air pressure gage to show the pressure available for braking.
    D. An air application gauge to show the pressure available for braking.

15. You can tell if your vehicle is equipped with Antilock Braking System if there is a _____malfunction lamp on the dash board. (5.1.16

    A. Red
    B. Blue
    C. Yellow
    D. Green

16. The application pressure gauge shows the driver how much pressure: (5.2)

A. Has been used on this trip.
B. Is in the air tanks.
C. Is being applied to the brakes.
D. None of the above.

17. The vehicle must have a warning device, which comes on when air pressure in the service air tanks falls below? (5.2)

A. 40 psi.
B. 50 psi.
C. 60 psi.
D. 80 psi.

17. During normal operations, the parking and emergency brakes are usually held back by: (5.2)

A. Air pressure.
B. Spring pressure.
C. Centrifugal force.
D. Bolts or clamps.

18. What can legally hold a parking or emergency brake in position for a truck, truck tractor, or bus? (5.3)

A. Fluid pressure.
B. Spring pressure.
C. Air pressure.
D. Any of the above.

19. What turns on the electrical stop light switch in an air brake system? (5.3)

A. Spring pressure.
B. Hydraulic pressure.
C. Air pressure.
D. The driver, by hand.

20. In an air brake equipped vehicle, when do you use the parking brakes: (5.3)

A. When slowing down.
B. As little as possible.
C. Whenever you park the vehicle.
D. Only during pre and post trip inspections.

21. What will determine how effective the spring emergency brakes or the parking brakes are working? (5.3.3)

A. Has nothing to do with the condition of the service brakes.
B. Can only be tested by highly trained brake service people.
C. Depends on the adjustment of the service brakes.
D. It increases when the service brakes are hot.

22. If your truck or bus has a dual parking control valve, you can use pressure from a separate tank to: (5.4)

A. Release the emergency brakes to move a short distance.
B. Apply more brake pressure for stopping if the main tank is getting low.
C. Stay parked without using up service air pressure.
D. Balance the service brake system while you drive.

23. Your vehicle has a dual air brake system. If a low air warning pressure comes on for the secondary system, you should? (5.4)

A. Stop, safely park, and continue only when the system is repaired.
B. Reduce your speed, and test the remaining system while under way.
C. Reduce your speed and drive to the nearest garage for service.
D. Continue at normal speed, no action is needed when the secondary system fails.

24. Of the choices below, the first thing to do when the low air pressure warning comes on is: (5.3)

A. Stop and safely park as soon as you can.
B. Up-shift.
C. Adjust the brake pedal for more travel.
D. Open the air supply control valve.

25. When does the Driver's Manual advise disconnecting the steering axle brakes to help keep the unit straight? (5.4)

A. Never.
B. When the road is slippery.
C. When driving in very hilly areas.
D. When towing a trailer that has brakes.

26. How would you use the stab braking technique during emergency braking?5.4.3

A. Brake hard with the brake pedal and hand valve until stopped
B. Brake hard with the pedal until the wheels lock, then let off the brakes for as long as the wheels were locked
C. Brake hard with the pedal until the wheels lock, then let off until the wheels start rolling again
D. Pump the brake pedal rapidly and lightly.

27. On a heavy vehicle, the emergency brake is usually held in place by spring pressure because air pressure can leak away. (5.1.15

A. True
B. False

28. The color of the parking control knob on the dash of the vehicle is _____. (5.5.15)

A. Yellow
B. Red
C. Blue
D. Green

29. A tractor, truck or bus equipped with Antilock Braking System_____. (5.1.16)

A. decreases braking distance
B. Increases braking distance
C. Avoids wheel lock up.
D. Is used on wet pavement

30. During normal driving, parking and emergency brakes are usually held back by (5.1.15)

A. Spring Pressure.
B. Air pressure
C. Centrifugal force.
D. Hand valve

THIS COMPLETES CDL AIR BRAKES PRACTICE TEST NUMBER 1. SELF-GRADE YOUR TEST AND RE-STUDY THE QUESTIONS YOU MISSED. TAKE PRACTICE TEST NUMBER TWO NEXT.

AIR BRAKES
PRACTICE TEST # 2

Use the same instructions from practice test number 1 to complete practice test number 2. If you scored 3 or less wrong, you are ready to challenge the CDL written test, AIR BRAKES.

GOOD LUCK

1. How do you check the free-play on manual slack adjusters? (5.3)

   A. Stop on level ground and apply the emergency brakes.
   B. Park on level ground chock the wheels, release the parking brakes and pull the slack adjuster.
   C. Park on level ground and drain off air pressure before making adjustments.
   D. Apply the service brakes by hand at the brake chambers and watch the slack adjusters move.

2. The air leakage rate for a combination vehicle (engine off, brakes on) should be less than_____ psi per minute? (5.3)

   A. 1 psi.
   B. 2 psi
   C. 3 psi.
   D. 4 psi.

3. With the engine off and the brakes released, a combination vehicle air brake system should not leak more than how many psi per minute? (5.3)

   A. 1 psi.
   B. 2 psi.
   C. 3 psi.
   D. 4 psi.

4. A straight truck or bus air brake system cannot leak more than _____ psi per minute with the engine off and the brakes released? (5.3)

   A. 1 psi.
   B. 2 psi.
   C. 3 psi.
   D. 4 psi.

5. Air loss in a straight vehicle (not a combination unit) should not be more than _____psi with the engine off and the brakes on? (5.3)

   A. 1 psi in 30 seconds.
   B. 1 psi in one minute.
   C. 2 psi in 45 seconds.
   D. 3 psi in one minute.

6. When should you test the parking brake? When the vehicle is: (5.3)

   A. Parked.
   B. Moving slowly.
   C. Going down hill.
   D. Moving at highway speed.

7. You must make a quick emergency stop. You should brake as you: (5.3)

   A. Steer hard as you brake hard.
   B. Use the full power of the brakes and lock them.
   C. Stay in a straight line and maintain steering control.
   D. Burn up the hand brake first.

8. To use the stab braking technique during emergency braking, you: (5.4)

   A. Pump the brake pedal rapidly and lightly.
   B. Brake hard with the pedal until the wheels lock, then get off the brake until the wheels begin rolling again.
   C. Brake hard with the pedal until the wheels lock, then get off the brakes for as long as the wheels are locked.
   D. Brake hard with the pedal and hand valve until you stop.

9. You will know when your brakes are fading when: (5.4)

   A. You need more brake pressure to keep the same speed on a downgrade.
   B. The brake pedal “fades away” when you press on it.
   C. You get off the brake pedal and speed increases.
   D. You need less pressure on the brake pedal for each stop.

10. Why should you NOT fan your brakes on and off during long downgrades? (5.4)

    A. Air usage is less when you fan.
    B. Brake linings do not get hot when fanning.
    C. The short time off the brakes does not allow brake cooling.
    D. None of the above.

11. Air braking takes more time than hydraulic braking because air: (5.4.4)

    A. Brakes use different brake drums.
    B. Takes more time to flow through the lines than hydraulic.
    C. Brakes require heavier return springs.
    D. Is always leaking through airline fittings.

12. Which of the following makes the total stopping distance for air brakes longer than that for hydraulic brakes? (5.4.4)

    A. Perception distance.
    B. Reaction distance.
    C. Brake lag distance.
    D. Effective braking distance.

13. The brake system that applies and releases the brakes when the driver uses the brake pedal is the _____ brake system. (5-1)

    A. Emergency.
    B. Service.
    C. Parking.
    D. None of the above.

14. The driver must be able to see a warning that is given when air pressure in the service air tanks falls below? (5-4)

    A. 40 psi.
    B. 50 psi.
    C. 60 psi.
    D. 75 psi.

15. An air brake system safety relief valve opens at about? (5.1.6)

    A. 40 psi.
    B. 120 psi.
    C. 150 psi
    D. 200 psi.

16. When some air brakes in the system are doing more work than others: (5.4.5)

    A. Those brakes will develop more heat.
    B. You may experience brake fade.
    C. Vehicle handling will be affected.
    D. All of the above.

17. Your safety relief valve has opened several times, this means _____: (5.1.6)

A. The system is working properly.
B. Air pressure is probably low.
C. The system needs immediate attention.
D. The system needs flushed.

18. At what air pressure should the low air warning alarm come on? (5.1.11)

A. 45 psi.
B. 25 psi.
C. Must come on by 60 psi.
D. 150 psi.

19. With the brakes released on a single vehicle, what is the allowable air lost?: (5-3)

A. 4 psi.
B. 3 psi.
C. 2 psi.
D. 1 psi.

20. To test the compressor on a dual air brake vehicle, run the engine at a fast idle to charge the air system, your gauge should show you _____: (5-3)

A. Pressure builds from 85 to 100 psi within three minutes.
B. Your pressure builds from 85 to 100 psi with in 45 seconds.
C. The compressor cuts out by 75 psi.
D. None of the above applies.

21 Spring brakes are held on by_____: (5-1)

A. Air pressure.
B. Electrical current.
C. Forces other than air, electrical or hydraulic.
D. The drivers hand valve.

22. Most large vehicles with air brakes have spring brakes which? (5-1)

A. Are part of the parking brake systems operation only?
B. Is part of the service brake system only?
C. Are part of both the parking and emergency brakes?
D. Is part of the front suspension only?

23. What color is the parking control knob on the dash of the vehicle? (5-1)

A. Red.
B. Green.
C. Yellow.
D. Black.

24. What would cause all of the air brake systems on a vehicle to have poor braking power? (5-4)

A. Low hydraulic fluid.
B. Brakes being out of adjustment.
C. A broken air line.
D. Load too heavy.

25. If a low air pressure warning comes on, what should you do? (5-4)

A. Stop and safely park your vehicle soon as possible.
B. You can safely continue until you get to the next service center.
C. Turn it off so that it will not distract you.
D. Steer onto the left shoulder.

26. Operating a vehicle equipped with Antilock Brakes (ABS) helps you avoid wheel lock up.(5.4.2)

A. True
B. False

27. When only the tractor is equipped with ABS, you should (5.4.2)

A. Always pull a trailer equipped with ABS
B. Be able to maintain control in a skid
C. Be prepared to lose control
D. Disconnect the ABS on the Tractor

28 You still have normal brake functions if your ABS is not working.

A. True
B. False

CONGRATULATIONS

YOU HAVE COMPLETED PRACTICE TEST NUMBER 2 IN AIR BRAKES. SELF-GRADE YOUR TEST. IF YOU MISSED LESS THAN 3 QUESTIONS, YOU ARE READY TO TAKE THE WRITTEN TEST.

AIR BRAKES
PRACTICE TEST # 1
ANSWER SHEET

1. D
2. B
3. B
4. A
5. D
6. B
7. C
8. A
9. B
10. B
11. C
12. B
13. B
14. C
15. C
16. C
17. A
18. B
19. C
20. C
21. C
22. A
23. A
24. A
25. A
26. C
27. A
28. A
29. C
30. B

AIR BRAKES
PRACTICE TEST # 2
ANSWER SHEET

1. B
2. D
3. C
4. B
5. D
6. A
7. C
8. B
9. A
10. C
11. B
12. C
13. B
14. C
15. C
16. D
17. C
18. C
19. C
20. B
21. C
22. C
23. C
24. B
25. A
26. A
27. B
28. A