PRACTICE EXAM 14

1. A governor's normal operating differential between cut-in and cut-out is most commonly about:

A. 2 to 5 psi

B. 20 to 25 psi

C. 50 to 60 psi

D. 75 to 90 psi

2. The low-pressure warning device must alert the driver at approximately:

A. 60 psi

B. 100 psi

C. 130 psi

D. 150 psi

3. A governor with a 130 psi cut-out should have a cut-in pressure near:

A. 60 psi

B. 108 psi

C. 140 psi

D. 95 psi

4. The spring (parking) brakes typically auto-apply when system pressure falls to roughly:

A. 90 to 110 psi

B. 110 to 125 psi

C. 70 to 85 psi

D. 20 to 45 psi

5. The safety relief valve on the supply reservoir is commonly set to vent at around:

A. 60 psi

B. 100 psi

C. 130 psi

D. 150 psi

6. A common governor cut-out range for a transit air brake system is approximately:

A. 60 to 75 psi

B. 120 to 135 psi

C. 150 to 165 psi

D. 90 to 105 psi

7. A timed leakage test commonly observes the pressure drop over a period of:

A. 10 seconds

B. 1 minute

C. 15 minutes

D. 1 hour

8. Kinetic energy a brake must absorb when a bus doubles its speed from 20 to 40 mph increases by a factor of:

A. 4

B. 2

C. 1.4

D. 8

9. Wheel bearing end play on a heavy transit vehicle is typically specified in the range of:

A. Several whole inches

B. A few thousandths of an inch

C. A few tenths of an inch

D. Several millimeters of looseness

10. A brake chamber designated Type 30 has a larger effective diaphragm area than a Type 24, meaning at the same pressure it produces:

A. Less pushrod force

B. The same pushrod force

C. Hydraulic pressure

D. More pushrod force

11. The low-pressure warning must activate before pressure reaches the point where the spring brakes:

A. Release fully

B. Auto-apply at the lower threshold

C. Convert to hydraulic operation

D. Increase the governor cut-out

12. A governor differential that is too small causes the compressor to:

A. Never build pressure

B. Cycle rapidly between load and unload

C. Over-pressurize past the relief valve

D. Purge the dryer continuously

13. A governor differential that is too large causes:

A. Rapid compressor cycling

B. Continuous dryer purging

C. Excessive swings in system pressure

D. Wheel bearing overheating

14. The maximum allowable pushrod stroke depends on the:

A. Governor cut-out pressure

B. Brake chamber type and size

C. Brake fluid boiling point

D. Wheel bearing end play

15. A bus must store enough reservoir air for multiple brake applications with the compressor off, a requirement set by:

A. The wheel bearing manufacturer

B. The brake fluid specification

C. The air dryer service interval

D. FMVSS 121

16. A larger brake chamber type produces more clamping force because pushrod force equals air pressure times the:

A. Governor cut-out value

B. Pushrod stroke length

C. Effective diaphragm area

D. Reservoir capacity

17. A drum measured beyond its stamped maximum diameter is:

A. Within service limits

B. Acceptable if linings are new

C. Acceptable if recently machined

D. Out of service and must be replaced

18. A wheel bearing adjusted too tight (preloaded) with essentially zero end play will most likely:

A. Develop excessive play

B. Improve fuel economy

C. Purge the dryer constantly

D. Overheat and fail rapidly

19. The governor signals the compressor to unload at the:

A. Cut-out pressure

B. Cut-in pressure

C. Warning pressure

D. Relief pressure

20. Cut-in pressure is described as:

A. The lower pressure at which the compressor reloads

B. The higher pressure at which the compressor unloads

C. The pressure at which the relief valve vents

D. The pressure at which the spring brakes release

21. A pushrod stroke reading is taken with the brakes:

A. Released and the engine running

B. Partially applied at idle

C. Fully applied at a specified pressure

D. Caged and secured

22. Excessive pushrod stroke beyond the readjustment limit is classified as:

A. A normal wear condition

B. A primary out-of-service brake defect

C. A benefit on long grades

D. An air dryer fault

23. A leakage test that exceeds the maximum allowable air loss rate per minute indicates:

A. A correctly sealed system

B. A normal accumulation of moisture

C. A properly adjusted slack adjuster

D. A leak that must be located and corrected

24. The low-pressure warning around 60 psi gives the driver time to react before pressure drops to the spring-brake auto-apply range of roughly:

A. 20 to 45 psi

B. 60 to 75 psi

C. 90 to 110 psi

D. 120 to 135 psi

25. A bus at highway speed generates far more brake heat than at low speed because kinetic energy rises with the:

A. Cube of speed

B. Square of speed

C. Square root of speed

D. Reciprocal of speed

26. A governor verified at 148 psi cut-out against a 125 psi specification indicates the governor is:

A. Within specification

B. Set too low

C. Reading the relief pressure

D. Out of adjustment and set too high

27. Heavy-vehicle wheel bearings are adjusted to a small end play rather than zero clearance to allow for:

A. Faster air dryer purging

B. A higher governor cut-out

C. Reduced compressor workload

D. Lubrication and thermal expansion

28. A reservoir's maximum allowable air loss differs between the released and applied tests, but in both cases an excessive drop means a:

A. Properly sealed circuit

B. Leak requiring correction

C. Correct governor setting

D. Normal pressure cycle

29. A chamber's type number directly corresponds to its:

A. Effective diaphragm area

B. Maximum air pressure rating

C. Governor cut-in setting

D. Wheel bearing end play

30. A bus that never reaches full operating pressure with the governor cut-out set far too low will:

A. Over-pressurize the system

B. Purge the dryer constantly

C. Run short of air with frequent low-pressure warnings

D. Overheat the wheel bearings

31. Rotor minimum thickness is the specification below which the rotor must be:

A. Machined slightly thinner

B. Reused with new pads

C. Reversed and reinstalled

D. Replaced

32. A bus loses 14 psi per minute in the applied test but passes the released test. This indicates a leak on the:

A. Supply reservoir

B. Application side

C. Governor signal line

D. Compressor intake

33. A drum brake's lining must be replaced when worn below its:

A. Minimum allowable thickness

B. Maximum diameter

C. Governor cut-out

D. End-play limit

34. A bus with a cut-out of 125 psi and a cut-in of 105 psi has an operating differential of:

A. 5 psi

B. 20 psi

C. 50 psi

D. 0 psi

35. The reason the dashboard gauge is unsuitable for setting governor pressures is that it is:

A. Calibrated only for hydraulic pressure

B. Limited to readings below 60 psi

C. Used only for the parking brake

D. Not accurate enough for setting specifications

36. Brake fade from heat occurs because high temperature:

A. Increases the lining's coefficient of friction

B. Raises the brake fluid boiling point

C. Lowers the lining's coefficient of friction

D. Improves the drum's heat capacity

37. Air pressure delivered to the spring section of a combination chamber causes the parking brake to:

A. Release

B. Apply

C. Cage

D. Compound

38. A governor cut-in that is set too close to cut-out (too small a differential) produces:

A. Excessive pressure swings

B. Continuous dryer purging

C. Wheel bearing overheating

D. Rapid compressor cycling

39. The maximum allowable drum diameter is stamped on the drum as a:

A. Lining thickness limit

B. Governor pressure setting

C. Wear limit for replacement

D. Pushrod stroke limit

40. A combination chamber's spring section is held released during driving by air pressure, so a drop to the auto-apply threshold causes the brake to:

A. Release further

B. Convert to hydraulic

C. Apply automatically

D. Increase cut-out

41. Pushrod stroke is the master adjustment indicator because excessive stroke means the brake applies:

A. Late and with reduced force

B. Early and with more force

C. Only at high speed

D. Faster than commanded

42. A bus must retain enough stored air for several stops after the compressor stops because reservoirs provide:

A. Hydraulic backup pressure

B. Spring-brake caging force

C. A reserve supply per FMVSS 121

D. Wheel bearing lubrication

43. The governor's two setpoints, in correct order from lower to higher, are:

A. Relief then warning

B. Cut-out then cut-in

C. Warning then relief

D. Cut-in then cut-out

44. A bus building to only 105 psi before the compressor unloads, when spec cut-out is 125 psi, indicates the governor cut-out is set:

A. Too low

B. Too high

C. At the relief pressure

D. Correctly

45. A timed pressure-drop test isolating supply-side leaks is performed with the brakes:

A. Applied and held

B. Pumped rapidly

C. Released

D. Partially applied

46. A wheel end with essentially no end play and an abnormally hot hub, with no dragging brake, indicates the bearing is:

A. Under-adjusted

B. Over-tight (preloaded)

C. Correctly set

D. The wrong chamber type

47. A drum exceeding maximum diameter cannot safely be used because it is too thin to:

A. Hold the wheel studs

B. Convert air to hydraulic pressure

C. Absorb braking heat

D. Cage the spring brakes

48. A larger operating differential than specified will cause system pressure to:

A. Remain perfectly constant

B. Never reach cut-out

C. Swing more widely between cut-in and cut-out

D. Purge the dryer continuously

49. The low-pressure warning and the spring-brake auto-apply are set at different pressures so that:

A. Both occur at exactly the same point

B. The auto-apply occurs first

C. The warning occurs only after auto-apply

D. The warning gives the driver time before auto-apply

50. A bus that builds past cut-out until the relief valve vents at 150 psi has a governor cut-out that is effectively:

A. Not functioning to unload the compressor

B. Set too low

C. Reading hydraulic pressure

D. Correctly limiting pressure

51. Reservoir air loss is measured against a per-minute limit because excessive loss:

A. Improves braking response

B. Robs the system of reserve pressure

C. Increases the governor cut-out

D. Speeds the dryer purge usefully

52. A bus at 60 mph carries how many times the kinetic energy it has at 30 mph?

A. Two times

B. Three times

C. Four times

D. Eight times

53. A chamber's readjustment limit is the maximum stroke before the brake is considered:

A. Properly adjusted

B. New

C. Out of adjustment

D. Caged

54. A governor cut-in of 105 psi means the compressor will begin building again once pressure falls to:

A. 105 psi

B. 125 psi

C. 60 psi

D. 150 psi

55. The spring-brake auto-apply threshold being well below normal operating pressure ensures the brakes apply only when air is:

A. Dangerously low

B. At full operating pressure

C. Above cut-out

D. At the relief setting

56. A leakage test exceeding the allowable rate in the applied condition points to components pressurized only on:

A. The supply side at rest

B. The governor signal line

C. Brake application

D. The compressor intake

57. Wheel bearing end play is verified to a small specified value using a:

A. Brake drum micrometer

B. Lining thickness gauge

C. Dial indicator

D. Air pressure test gauge

58. A bus must have ABS on its air brake system as required by:

A. The brake fluid specification

B. The wheel bearing manufacturer

C. The air dryer service interval

D. FMVSS 121

59. A governor cut-out reading above specification should prompt the technician to:

A. Adjust or replace the governor

B. Replace the safety relief valve

C. Replace the air dryer cartridge

D. Adjust the wheel bearings

60. A brake chamber's pushrod force at a given pressure is determined by multiplying that pressure by the:

A. Effective diaphragm area

B. Governor cut-out value

C. Reservoir capacity

D. Wheel bearing end play

Answer Key & Full Answer Explanations

1. B — The normal operating differential between cut-in and cut-out is about 20 to 25 psi. Too small a gap causes rapid cycling, while too large lets pressure swing excessively, so this range balances both.

2. A — The low-pressure warning must alert the driver at approximately 60 psi, well before pressure becomes dangerously low. The higher values are normal operating pressures, not the warning threshold.

3. B — Cut-in is normally about 20 to 25 psi below cut-out, so a 130 psi cut-out pairs with a cut-in near 108 psi. The other values fall outside the normal differential.

4. D — Spring brakes typically auto-apply when system pressure falls to roughly 20 to 45 psi, ensuring the bus cannot operate on dangerously low air. The higher ranges are normal operating pressures.

5. D — The safety relief valve is commonly set to vent near 150 psi, well above normal cut-out, as a last-resort protection against over-pressure. The lower values are normal operating pressures.

6. B — A common governor cut-out range for a transit air brake system is about 120 to 135 psi. The lower and higher ranges are not typical operating cut-out values.

7. B — A timed leakage test commonly observes the pressure drop over a period of one minute. Ten seconds is too short to read a meaningful rate, and longer intervals are impractical.

8. A — Because kinetic energy rises with the square of speed, doubling from 20 to 40 mph increases the energy by a factor of four. It is not two, 1.4, or eight.

9. B — Wheel bearing end play is typically specified in a few thousandths of an inch. Whole inches, tenths, or millimeters of looseness would be far out of spec.

10. D — A Type 30 has a larger effective diaphragm area than a Type 24, so at the same pressure it produces more pushrod force. It does not produce less, the same, or hydraulic pressure.

11. B — The low-pressure warning must activate before pressure reaches the point where the spring brakes auto-apply at the lower threshold, giving the driver time to react. It is unrelated to releasing, hydraulic conversion, or cut-out.

12. B — A differential that is too small causes the compressor to cycle rapidly between load and unload because it reloads almost immediately. It does not stop building, over-pressurize, or purge continuously.

13. C — A differential that is too large causes excessive swings in system pressure between a high cut-out and a low cut-in. Too small a differential causes rapid cycling; the dryer and bearings are unrelated.

14. B — The maximum allowable pushrod stroke depends on the brake chamber type and size, with larger chambers having larger limits. It is not tied to cut-out, fluid boiling point, or bearing end play.

15. D — The reservoir capacity requirement ensuring multiple applications with the compressor off is set by FMVSS 121. The bearing manufacturer, fluid spec, and dryer interval do not set it.

16. C — Pushrod force equals air pressure times the effective diaphragm area, so a larger chamber produces more force. Cut-out value, stroke length, and reservoir capacity are not the multiplier.

17. D — A drum beyond its stamped maximum diameter is out of service and must be replaced, since it is too thin to handle heat. It is not within limits or acceptable with new linings or recent machining.

18. D — An over-tightened (preloaded) bearing with zero end play has no clearance for lubrication and thermal growth, so it overheats and fails rapidly. Excessive play results from under-adjustment, not preload.

19. A — The governor signals the compressor to unload at cut-out, the higher setpoint. Cut-in is the reload point, and warning and relief are different protective thresholds.

20. A — Cut-in is the lower pressure at which the compressor reloads and resumes building. It is not the unload pressure, relief venting, or spring-brake release point.

21. C — Pushrod stroke is taken with the brakes fully applied at a specified pressure, measuring travel against the chamber-type limit. Released, partially applied, or caged conditions are not how stroke is measured.

22. B — Excessive pushrod stroke beyond the readjustment limit is a primary out-of-service brake defect. It is not normal wear, a benefit, or a dryer fault.

23. D — A leakage test exceeding the maximum allowable rate indicates a leak that must be located and corrected. It is not a sealed system, normal moisture, or a slack-adjuster condition.

24. A — The 60 psi warning gives the driver time before pressure drops to the spring-brake auto-apply range of roughly 20 to 45 psi. The higher ranges are normal operating pressures.

25. B — A bus at highway speed generates far more heat because kinetic energy rises with the square of speed. It is not the cube, square root, or reciprocal of speed.

26. D — A cut-out reading 148 psi against a 125 psi spec means the governor is out of adjustment and set too high, requiring correction. It is not within spec, set too low, or reading relief pressure.

27. D — Heavy-vehicle bearings are set to a small end play to allow clearance for lubrication and thermal expansion. The clearance is unrelated to purging, cut-out, or compressor workload.

28. B — In both the released and applied tests, an excessive drop means a leak requiring correction, even though the allowable rates differ. It does not indicate a sealed circuit, correct governor setting, or normal cycle.

29. A — A chamber's type number corresponds directly to its effective diaphragm area, which sets pushrod force. It is not the maximum pressure rating, cut-in setting, or bearing end play.

30. C — A cut-out set far too low means the compressor unloads early, so the bus never reaches full pressure and runs short of air with frequent low-pressure warnings. It would not over-pressurize, purge constantly, or overheat bearings.

31. D — Rotor minimum thickness is the specification below which the rotor must be replaced, since a thinner rotor cannot manage heat. It cannot be machined thinner, reused, or reversed.

32. B — A leak failing the applied test but passing the released test is on the application side, pressurized only when applied. The supply reservoir, governor signal line, and intake would not behave this way.

33. A — A lining must be replaced when worn below its minimum allowable thickness. Maximum diameter, cut-out, and end-play limit do not apply to lining wear.

34. B — A 125 psi cut-out and 105 psi cut-in give an operating differential of 20 psi, within the normal range. It is not 5, 50, or 0 psi.

35. D — The dashboard gauge is unsuitable for setting governor pressures because it is not accurate enough for setting specifications. It is not hydraulic-only, capped at 60 psi, or parking-brake-only.

36. C — Brake fade from heat occurs because high temperature lowers the lining's coefficient of friction. It does not increase friction, raise the boiling point, or improve heat capacity.

37. A — Air pressure delivered to the spring section compresses and holds the power spring back, causing the parking brake to release. Exhausting air applies it; caging and compounding are unrelated.

38. D — A cut-in too close to cut-out (too small a differential) produces rapid compressor cycling because it reloads almost immediately. Excessive pressure swings come from too large a differential.

39. C — The stamped maximum drum diameter is a wear limit for replacement. It is not a lining thickness limit, governor setting, or stroke limit.

40. C — Because the spring section is held released by air, a drop to the auto-apply threshold causes the brake to apply automatically. It does not release further, convert to hydraulic, or raise cut-out.

41. A — Pushrod stroke is the master indicator because excessive stroke means the brake applies late and with reduced force. It does not apply early with more force, only at high speed, or faster than commanded.

42. C — Reservoirs provide a reserve supply per FMVSS 121 so the bus retains several stops after the compressor stops. They do not provide hydraulic backup, caging force, or bearing lubrication.

43. D — In order from lower to higher, the governor's setpoints are cut-in then cut-out. Relief and warning are separate protective thresholds, not the governor's operating pair.

44. A — Building to only 105 psi when spec cut-out is 125 psi means the governor cut-out is set too low, so the bus runs short of air. It is not too high, at relief, or correct.

45. C — The supply-side-isolating leak test is performed with the brakes released, since only the supply side is pressurized at rest. Applied, pumped, or partially applied conditions test the application side.

46. B — A hot hub with essentially no end play and no dragging brake indicates an over-tight (preloaded) bearing with no lubrication clearance. A loose bearing would show excessive play, and a chamber type is unrelated.

47. C — A drum exceeding maximum diameter is too thin to absorb braking heat, which is why it cannot be used safely. It is unrelated to holding studs, hydraulic conversion, or caging.

48. C — A larger-than-specified differential causes system pressure to swing more widely between cut-in and cut-out. It does not remain constant, fail to reach cut-out, or purge the dryer continuously.

49. D — The warning and auto-apply are set at different pressures so the warning gives the driver time before the spring brakes auto-apply. They are not at the same point, nor does auto-apply or the warning occur in reverse order.

50. A — A compressor building past cut-out until the relief valve vents at 150 psi means the governor cut-out is effectively not functioning to unload the compressor. It is not set too low, reading hydraulic pressure, or correctly limiting pressure.

51. B — Reservoir air loss is measured against a per-minute limit because excessive loss robs the system of reserve pressure. It does not improve response, raise cut-out, or usefully speed purging.

52. C — Because energy rises with the square of speed, a bus at 60 mph carries four times the kinetic energy it has at 30 mph. It is not two, three, or eight times.

53. C — A chamber's readjustment limit is the maximum stroke before the brake is considered out of adjustment. It is not properly adjusted, new, or caged at that point.

54. A — A cut-in of 105 psi means the compressor begins building again once pressure falls to 105 psi. The other values are cut-out, warning, or relief pressures, not cut-in.

55. A — The auto-apply threshold being well below normal operating pressure ensures the spring brakes apply only when air is dangerously low. It is not at full pressure, above cut-out, or at relief.

56. C — An applied-condition leak exceeding the allowable rate points to components pressurized only on brake application. The supply side at rest, governor signal line, and intake are not pressurized only on apply.

57. C — Wheel bearing end play is verified to a small specified value with a dial indicator. A drum micrometer, lining gauge, or air gauge cannot make this measurement.

58. D — A bus must have ABS on its air brake system as required by FMVSS 121. The fluid spec, bearing manufacturer, and dryer interval do not mandate ABS.

59. A — A governor cut-out reading above specification should prompt adjusting or replacing the governor. Replacing the relief valve, dryer cartridge, or adjusting bearings does not fix the governor.

60. A — Pushrod force at a given pressure is determined by multiplying that pressure by the effective diaphragm area. Cut-out value, reservoir capacity, and bearing end play are not the multiplier.