True/False

Indicate whether the statement is true or false.

____ 1. Dynamic balancing is the preferred method of balancing tire and wheel assemblies.
____ 2. A tire puncture greater than a 1/4 inch can be repaired.
____ 3. Excessive tire radial runout may cause tire thumping and vibration.
____ 4. Tire conicity is a visible defect that may be corrected by dynamic balancing.
____ 5. The rim offset is the distance between the rim centerline and the mounting face of the rim.
____ 6. Shock absorbers control spring action.
____ 7. Struts perform the same function as shock absorbers; however, struts may also support the top of the steering knuckle.
____ 8. Monoleaf springs may be manufactured from fiberglass.
____ 9. In some front suspension systems, torsion bars perform the same functions as coil springs.
____ 10. Excessive positive camber results in rapid wear on the inside edge of the tire tread.
____ 11. Rear-wheel drive trucks and vans have independent rear suspension systems.
____ 12. Variable rate rear springs may cause excessive rear body sway when driving on irregular road surfaces.
____ 13. Reduced rear curb riding height may cause damaged rear strikeout bumpers.
____ 14. A worn shock absorber or strut may increase braking distance.
____ 15. When removing a coil spring from a strut, some spring tension should be left on the upper strut mount before loosening the strut rod nut.
____ 16. Improper curb riding height affects other suspension alignment angles.
____ 17. A MacPherson strut front suspension requires more mounting space than a short-and-long arm front suspension.
____ 18. Some current vehicles have aluminum steering knuckles to reduce unsprung weight.
____ 19. The ball joint nut should not be backed off to install the cotter pin though the castle nut.
____ 20. Some independent rear suspension systems have a ball joint that attaches the lower control arm to the bottom of the knuckle.
____ 21. Bent tie rods may be heated and straightened.
____ 22. The breather tube in a rack and pinion steering gear allows air to flow from one bellows boot to the other boot during a turn.
____ 23. Some computer wheel aligners provide a ride height screen indicating where the ride height should be measured.
____ 24. Included angle is the sum of the SAI and the camber angle if the camber is negative.
25. Setback occurs when one wheel is driven rearward in relation to the opposite wheel.
26. Turning radius may be referred to as cornering angle.
27. The thrust line is an imaginary line positioned at a 90 degree angle to the rear wheel centerline and projected forward.
28. Ride height can be adjusted by repositioning the upper strut mounts on a MacPherson strut front suspension.
29. Front wheel camber is measured with the front wheels turned to the right.
30. The turning radius angle on the outside wheel is more than the turning radius angle on the inside wheel.
31. Excessive toe-in on the front wheels causes wear on the inside edge of the tire treads.
32. Front-wheel drive cars have a greater SAI angle to provide directional stability.
33. An incorrect SAI angle may be caused by a strut tower that is out of position.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

34. A vehicle pulls to the right when driving straight ahead. Technician A says the right front tire may have excessive radial runout. Technician B says the right-front tire may have a conicity defect. Who is correct?
   a. A only          c. Both A and B
   b. B only          d. Neither A nor B

35. Tire underinflation causes:
   a. Wear on the outer edges of the tread          c. Feathered wear across the tread
   b. Wear on the center of the tread              d. Cupping around the tread

36. Excessive heat buildup in a tire may be caused by:
   a. Improper dynamic balance          c. Improper static balance
   b. Underinflation                     d. Improper wheel alignment

37. When the tread wear indicator is visible across the tread, the tire should be:
   a. Repaired           c. Rotated
   b. Balanced          d. Replaced

38. The maximum lateral tire runout is:
   a. 0.015 inch          c. 0.075 inch
   b. 0.035 inch          d. 0.100 inch

39. Radial tire runout should be measured with a:
   a. Machinist's rule       c. Micrometer
   b. Dial indicator          d. Depth gauge

40. MacPherson strut replacement is being discussed. Technician A says that the lower rear strut hole may be elongated to allow for a camber adjustment on some vehicles. Technician B says that the lower rear strut hole may be elongated to allow for easier installation on difficult locations. Who is correct?
   a. A only          c. Both A and B
   b. B only          d. Neither A nor B

41. Technician A says when a front strut is fully compressed, the spring bumper on the strut rod provides a cushioning action. Technician B says the top of the strut housing should contact the spring bumper on the strut rod before the coils in the spring contact each other. Who is correct?
   a. A only          c. Both A and B
   b. B only          d. Neither A nor B
42. Technician A says that vehicle ride height could be affected by worn shock absorbers. Technician B says that vehicle ride height could be affected by tire pressure or incorrect tire size. Who is correct?
   a. A only 
   b. B only 
   c. Both A and B 
   d. Neither A nor B 

43. When the center of a front wheel viewed from the side is tilted rearward from the true vertical center of the wheel, this alignment angle referred to as:
   a. Positive camber 
   b. Negative camber 
   c. Positive scrub radius 
   d. Positive caster 

44. A 300-pound load deflects a linear-rate coil spring 1 inch. A 600-pound load will deflect the same spring how much in total?
   a. 1 inch 
   b. 2 inches 
   c. 3 inches 
   d. 4 inches 

45. Technician A says in a torsion bar front suspension, the front end of the torsion bar is always attached to the upper control arm. Technician B says in a torsion bar front suspension, a torsion bar adjustment mechanism is mounted where the rear end of the torsion bar is attached to the chassis. Who is correct?
   a. A only 
   b. B only 
   c. Both A and B 
   d. Neither A nor B 

46. The most likely cause of excessive body lean and sway while cornering is:
   a. A broken stabilizer link 
   b. Sagged coil springs 
   c. Worn strut rod bushings 
   d. Worn upper control arm bushings 

47. Technician A says damaged jounce or rebound bumpers may be caused by worn-out shock absorbers. Technician B says damaged jounce or rebound bumpers may be caused by sagged coil springs. Who is correct?
   a. A only 
   b. B only 
   c. Both A and B 
   d. Neither A nor B 

48. On a live-axle, leaf-spring rear suspension system, improper rear wheel tracking may be caused by:
   a. Sagged rear springs 
   b. Worn spring insulators 
   c. A broken spring center bolt 
   d. Broken spring leaves 

49. The left-rear upper spring insulator is broken on a MacPherson strut suspension system. The most likely result of this problem is:
   a. Harsh ride quality 
   b. Increased left-rear positive camber 
   c. Increased toe-out on the left-rear wheel 
   d. A rattling noise on irregular road surfaces
50. Technician A says when performing a shock absorber manual test, the shock absorber's resistance to movement may be greater on the rebound stroke compared with the compression stroke. Technician B says if the shock absorber's resistance to movement is jerky and erratic, shock absorber replacement is necessary. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

51. Technician A says when the suspension height is normal, the valve orifices in a travel-sensitive strut provide more resistance to oil movement. Technician B says a travel-sensitive strut provides more resistance to oil movement when the speed of upward or downward wheel movement increases. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

52. The main function of a shock absorber or strut is to:
   a. Prevent wheel shimmy
   b. Reduce lateral wheel movement
   c. Prevent fore-and-aft wheel movement
   d. Control spring action

53. Shock absorbers and struts provide all of these functions EXCEPT:
   a. Improving ride quality
   b. Improving tire tread life
   c. Maintaining proper curb riding height
   d. Improving directional stability

54. Technician A says shock absorbers should be replaced if there is a slight oil film on the lower tube. Technician B says shock absorbers should be replaced if they have severe dents in the lower tube. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

55. Worn-out shock absorbers or struts may cause:
   a. Steering pull
   b. Suspension bottoming
   c. Excessive steering free play
   d. Lateral chassis oscillations

56. On a vehicle with a MacPherson strut front suspension system, there is a grinding noise coming from the right front area during low-speed parking lot maneuvers. What is the most likely cause?
   a. Worn outer tie rod
   b. Loose power steering drive belt
   c. Weak strut cartridge
   d. Worn upper strut bearing

57. Technician A says that in some short-and-long arm front suspension systems, the coil springs are mounted between the lower control arm and the chassis. Technician B says that in this type of suspension system, the upper ball joints are the load-carrying ball joints. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

58. Technician A says that a problem with the vehicle ride (curb) height does not affect a vehicle's alignment. Technician B says that incorrect rear (curb) ride height could be corrected by installing new springs. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

59. All of these statements about heavy-duty coil springs are true EXCEPT:
   a. Larger wire diameter than regular duty coil springs
   b. 3 to 5 percent more load-carrying capacity than regular duty coil springs
   c. Shorter free length than regular duty coil springs
   d. A high aluminum content in the spring material
60. A vehicle has sagged rear springs and reduced rear curb riding height. This problem results in:
   a. Excessive positive camber on the front wheels
   b. Excessive toe-out on the front wheels
   c. Excessive positive caster on the front wheels
   d. Excessive toe-in on the front wheels

61. Technician A says when measuring vertical ball joint wear, pry upward with a steel bar under the front tire and observe the dial indicator reading. Technician B says when measuring lateral ball joint wear, grasp the tire at the top and bottom and try to force the tire inward and outward and observe the dial indicator reading. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

62. Types of ball joint mounting in the lower control arm include all of these EXCEPT:
   a. Welded
   b. Threaded
   c. Riveted
   d. Press-fit

63. On a vehicle equipped with rear parallel leaf springs and a solid rear axle, the customer is complaining that the vehicle reacts erratically (it darts) during turns. What is the most likely cause of this complaint?
   a. Incorrect ride height
   b. Incorrect drive line angle
   c. Loose rear axle U-bolts
   d. Missing jounce/rebound bumpers

64. Technician A says decreased steering effort may be caused by sagged rear springs. Technician B says sagged rear springs may cause fast steering wheel return. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

65. The jounce bumpers on the rear struts are severely damaged. Technician A says the rear struts may be worn out. Technician B says the rear spring may be worn. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

66. Power rack and pinion steering gear operation are being discussed. Technician A says the position of the rotary valve inside the spool valve directs the fluid to the appropriate side of the rack piston. Technician B says during a right turn, fluid is directed to the right side of the rack piston and the rack is moved to the left. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

67. The inside of both bellows boots are contaminated with power steering fluid on a rack and pinion steering gear. Technician A says if fluid is leaking past a rack seal into one boot, oil may flow through the breather tube to the opposite boot. Technician B says that there should be fluid in the bellows boot, and this is a normal condition. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

68. Technician A says excessive positive caster may cause front wheel shimmy. Technician B says excessive positive caster increases steering effort and causes harsh riding. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

69. What effect will an incorrect rear wheel thrust angle have on the front suspension?
   a. It will affect steering wheel position
   b. Steering shimmy
   c. Cause camber tire wear
   d. Affect front steering axis inclination

70. All of these statements about improper caster are true EXCEPT:
   a. May cause pull while braking
   b. May cause feathered tire tread wear
   c. May cause front wheel shimmy
   d. May cause excessive steering effort
71. Caster adjustments may be provided by all of these methods EXCEPT:
   a. Adjusting tie-rod length        c. Upper control arm shims
   b. Adjusting strut rod length      d. Upper control arm eccentrics

72. Technician A says incorrect wheel alignment angles will reduce tire tread life. Technician B says wheel alignment is necessary after ball joint replacement. Who is correct?
   a. A only                             c. Both A and B
   b. B only                             d. Neither A nor B

73. Technician A says excessive toe-out (negative) on a front wheel causes rapid wear on the inside edge of the tire tread. Technician B says excessive positive camber on a front wheel causes premature wear on the outside edge of the tire tread. Who is correct?
   a. A only                             c. Both A and B
   b. B only                             d. Neither A nor B

74. When one of the front wheels strikes a road irregularity, the steering suddenly veers to the right or left on a vehicle with a parallelogram steering linkage. The most likely cause of this problem is:
   a. Worn-out shock absorbers          c. Sagged coil springs
   b. A weak stabilizer bar             d. Center link that is not level

75. The right-front wheel setback is excessive on a MacPherson strut front suspension system. The most likely cause of this problem is:
   a. A broken stabilizer bar           c. A binding right-upper strut mount.
   b. A bent engine cradle             d. Broken insulators on the right coil spring

76. During a wheel alignment, a technician suspects that the front cradle on a front-wheel-drive vehicle may have shifted. If the cradle was shifted from the right to the left, what effect would it have?
   a. Right camber will become more positive and left camber will become more negative evenly
   b. Left camber will become more positive and right camber will become more negative evenly
   c. Right caster will become more positive and left caster will become more negative evenly
   d. Left caster will become more positive and right caster will become more negative evenly

77. Technician A says front wheel toe should be measured with the front wheels in the straight-ahead position. Technician B says excessive front wheel toe-in causes steering pull to the right. Who is correct?
   a. A only                             c. Both A and B
   b. B only                             d. Neither A nor B

78. Technician A says if the front wheels have a toe-out condition, the distance between the front edges of the tires is greater than the distance between the rear edges of the tires. Technician B says many front-wheel drive cars have a slight toe-out setting because driving forces tend to move the front wheels to a toe-in position. Who is correct?
   a. A only                             c. Both A and B
   b. B only                             d. Neither A nor B

79. Technician A says on many rear-wheel drive cars, the front wheels are set to a slight toe-in position. Technician B says the driving forces on a rear-wheel drive car tend to move the front wheels to a toe-in position. Who is correct?
   a. A only                             c. Both A and B
   b. B only                             d. Neither A nor B
80. Technician A says the tool shown (highlighted) is used to adjust the booster's vacuum valve. Technician B says the tool is used to set the depth of the booster's diaphragm. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

81. Technician A says a restricted vacuum feed hose may cause loss of assist after several quick brake applications. Technician B says brake fluid in the vacuum feed hose indicates a leaking master cylinder seal. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

82. Technician A says the backing plate helps protect the brakes from road splash. Technician B says the drum helps protect the braking components from debris. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

83. Technician A says the following figure shows the correct method for checking wheel cylinder leaks. Technician B says the following figure shows the wheel cylinder boot being replaced. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

84. Technician A says if it is possible to reverse the shoes accidentally, the lining materials will be identical. Technician B says improper shoe placement could cause excessive brake wear. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B
85. Technician A says the following illustration shows the mechanism for a leading-trailing brake self-adjuster. Technician B says the following illustration shows a duo-servo brake assembly. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

86. Technician A says leading-trailing shoe drum brakes may have cam-type adjusters. Technician B says leading-trailing shoe drum brakes may have starwheel adjusters. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

87. Technician A says the primary shoe is usually the shoe toward the front of the vehicle. Technician B says the lining material on the secondary shoe usually has less area than that on the primary shoe. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B
88. The action shown in the following illustration is performed to:

a. measure the movement of the self-adjuster.
b. compare the thickness of the shoe lining.
c. check the diameter of the installed brake shoes.
d. make the initial brake adjustment.

89. On a duo-servo brake adjuster, what actually engages the starwheel to cause it to turn?

a. A lever or pawl  
b. The cable itself  
c. The primary shoe  
d. The secondary shoe

90. Technician A says the disadvantage of a brake design that uses the parking brake to adjust the shoes is that if the driver does not use the parking brake, the service brakes will not get adjusted. Technician B says the parking brake adjuster only works when the parking brake is applied and released while the vehicle is moving. Who is correct?

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

91. Which of the following will cause pulsation in the brake pedal when the brakes are applied?

a. Loose lining  
b. Grease on linings  
c. Out-of-round drum  
d. All of the above

92. Grabbing brakes are usually caused by:

a. glazed or worn linings.  
b. grease on linings.  
c. oil or brake fluid on linings.  
d. all of the above.

93. Technician A says it is okay to replace both front brakes without replacing the rear brakes. Technician B says it is okay to replace the brakes on one side of an axle without replacing the other side. Who is correct?

a. A only  
b. B only  
c. Both A and B  
d. Neither A nor B
94. **Technician A** says the setup shown in the following figure is being used to check drum internal diameter. **Technician B** says the setup shown in the following figure is being used to check for an out-of-round drum. Who is correct?

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B

95. **Technician A** says brake drums absorb braking heat and dissipate it into the air. **Technician B** says the thinner a drum gets, the better its ability to absorb and release heat. Who is correct?

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B

96. **Technician A** says the scratch cut shown below indicates that the drum is mounted on the lathe correctly. **Technician B** says the silencer band shown in the following figure is used to produce a smoother drum finish. Who is correct?

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B
97. Technician A says new drums may be protected by a coating that must be removed before installing the drums. Technician B says refinished drums contain metal particles that must be removed before installing the drums. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

98. The starwheel adjusting screw threads should be lubricated with:
   a. brake lubricant.
   b. brake fluid.
   c. penetrating oil.
   d. any of the above.

99. The backing plate shoe support pads should be:
   a. cleaned and lubricated with brake lubricant.
   b. cleaned with a file/grinder and left to dry.
   c. cleaned with a cleaner and left to dry.
   d. any of the above.

100. The drum measurement shown below is being discussed. The drum has a discard diameter of 11.400 inch. Technician A says to replace the drum. Technician B says the drum can be turned 0.005 inch and reused. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B

101. Technician A says the rotor hub contains the wheel bearing assembly. Technician B says the bearings on the nondriving wheels of many vehicles have tapered roller bearings. Who is correct?
   a. A only
   b. B only
   c. Both A and B
   d. Neither A nor B
102. The item indicated by the letter A is used to:

- indicate pad wear.
- alert the driver when the brakes are applied.
- reduce pad wear.
- turn on the brake warning light.

103. Technician A says the seal around the piston is used to seal the hydraulic pressure behind the piston. Technician B says the seal around the piston is used to retract the piston. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

104. Technician A says the procedure-indicated illustration is a method of seating new pads. Technician B says the procedure shown is a method of retracting the caliper piston. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

105. Technician A says some rear disc brakes have a small parking brake drum built into the center of the rotor. Technician B says some rear disc brakes move the caliper piston to apply the parking brake. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

106. Technician A says grabbing brakes may be caused by worn rotors or pads. Technician B says pedal pulsation when the brakes are applied is caused by grease or brake fluid contamination of the pads. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B
107. The tool shown in the illustration is used to:

![Diagram of a Piston and Caliper]

- extend the rear caliper piston.
- retract the front caliper piston.
- retract the rear caliper piston.
- extend the front caliper piston.

108. Technician A says on some vehicles the disc brake pads can be visually inspected without removing the calipers. Technician B says disc brake pad thickness can be measured without removing the calipers. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

109. Technician A says it is not necessary to disconnect the brake hose from the caliper if the caliper is not being removed from the vehicle. Technician B says on some vehicles the inner pad can be removed from the caliper without removing the caliper from the vehicle. Who is correct?

- A only
- B only
- Both A and B
- Neither A nor B

110. Disc brake caliper components should be cleaned in:

- denatured alcohol or clean DOT-3 or DOT-4 brake fluid.
- gasoline or kerosene.
- carbon tetrachloride.
- acetone or paint thinner.

111. Check rotor thickness variation by measuring with a micrometer calibrated in:

- thousandths of an inch.
- hundreds of an inch
- ten-thousandths of an inch.
- centimeters.

112. A rotor that does not meet specifications should be:

- refinished to specifications.
- replaced.
- lightly sanded.
- either A or C.
113. Technician A says the setup in Figure A is being used to check rotor thickness. Technician B says that the setup in Figure B is being used to check rotor lateral runout. Who is correct?

![Figure A](image1.png) ![Figure B](image2.png)

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B

114. All of the following statements about hard spots in the rotor are true EXCEPT:

a. hard spots are caused by high heat generated when braking.  

b. hard spots will appear dull red or brown.  

c. hard spots can be removed by grinding.  

d. hard spots are likely to reappear once the rotor is heated again.

115. Packing front wheel bearings is being discussed. Technician A says it is not necessary to repack the inner bearing since it is protected by the grease seal. Technician B says the grease seal should be replaced whenever the bearings are repacked. Who is correct?

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B

116. Technician A says a low pedal may be caused by air in the hydraulic system. Technician B says a low pedal may be caused by improperly adjusted shoes. Who is correct?

a. A only  

b. B only  

c. Both A and B  

d. Neither A nor B

**Matching**

With a Tire size of (P205 / 70 R16 87H) pick the correct term that explains the number best.

a. 205  

b. H  

c. 70  

d. 87

117. Aspect Ratio  

118. Width in Millimeters  

119. Speed Rating  

120. Load Index