SHOP SAFETY

1	Eye protection is optional if you are using a protective shield.	T	F
2	Eye protection should be worn during cleaning operations with compressed air.	T	F
3	When observing someone else drill or grind, only the person performing the work needs eye protection.	T	F
4	Watches and rings are only a hazard if you are working around batteries.	T	F
5	Clean and orderly work areas make for a safer work place.	T	F
6	Horseplay and practical jokes can cause someone to get hurt.	T	F
7	Every employee is responsible for the condition of hand or power tools.	T	F
8	If you have used a defective tool once or twice without getting hurt, it is probably okay to use it one more time.	T	F
9	A safe method for lifting is to bend your knees, not your back.	T	F
10	Clean up spills right away and put oily rags in an open container.	T	F
11	Gas welding goggles are not adequate for arc welding. For arc welding, use a welding hood with proper googles.	T	F
12	Always close oxygen and acetylene cylinders when work is finished.	T	F
13	Safety stands are optional when working under a vehicle that is supported by a jack.	T	F
14	Tires are only a hazard during the process of inflation.	T	F
15	Before beginning any electrical work which requires the removal of any battery connections, disconnect the ground cables first and connect it last after completing the work.	T	F
16	Most batteries are not heavy enough to require proper lifting procedures.	T	F

DRIVE TRAIN/TRANSMISSION

1	The correct adjustment sequence during a drive axle overhaul is; adjust pinion bearing pre-load, adjust differential carrier bearing pre-load and adjust ring gear and pinion backlash.	T	F
2	Drive shaft vibration after a new universal joint has been installed can be caused by a drive shaft installed out of phase.	T	F
3	If the drive shaft on a truck rotates but the rear wheels do not move, the cause could be a broken differential pinion gear shaft.	T	F
4	When a vehicle with an automatic transmission is sluggish on acceleration, and the engine is sluggish on acceleration, but the engine is properly tuned, it probably has a bad torque converter.	T	F
5	A stall test on an automatic transmission will check the converter starter clutch.	T	F
6	An automatic transmission does not work right. The first thing a mechanic should do is adjust the bands.	T	F
7	If a clutch in a standard transmission application has not enough free play it will cause the clutch to drag when disengaged.	T	F
8	A whining noise from the rear of the vehicle when the accelerator is released, and the vehicle is coasting, is caused by badly worn "U"joints.	T	F
9	If a growling, grinding or screeching noise is heard when the clutch pedal is depressed, the probable cause is a worn or defective clutch release (throwout) bearing.	T	F
10	If a light-duty vehicle clutch does not release properly after installation of a new clutch disc and pressure plate assembly, which are known to be the correct parts, the probable cause is badly worn clutch linkage.	T	F
11	The clutch brake on a heavy duty manual transmission holds the truck on a steep hill.	T	F
12	On an Allison transmission, wrong modulator adjustment could cause upshifts at too low of an engine speed.	T	F

13	A truck with an Allison transmission may be push started.	T	F

14	It is safe to tow a truck with an Allison transmission for five miles without disconnecting the drive line.	T	F
15	The lock up clutch in an Allison automatic disengages the torque converter.	T	F
16	A stuck governor valve on an Allison transmission will produce upshifts at too low a speed.	T	F
17	Low oil will cause an Allison transmission to overheat.	T	F
18	On an Allison transmission, to install a bearing on a shaft, you should preheat to 200 degrees Fahrenheit.	T	F
19	Auxiliary Allison transmission fi lters are mounted in the oil pan.	T	F
20	Maximum oil temperature in the oil pan of an Allison automatic should be 300 degrees Fahrenheit.	T	F
21	Gasket sealer should be used on the oil pan gasket of an Allison transmission.	T	F
22	Teflon seal rings are used in an Allison automatic.	T	F

	STEERING/SUSPENSION		
1	Hard steering and poor steering return after turns could be caused by replacement kingpins fitted too tight.	T	F
2	A steering gear adjusted too tight is a common cause of steering wheel shimmy at road speeds.	T	F
3	Steering-wheel shimmy at road speeds is probably due to front tires and wheels out of balance.	T	F
4	A feather-edge wear pattern on the front tires is probably caused by wrong toe-in adjustment.	T	F
5	Keeping spring U-bolts tight is an important maintenance operation. They should be periodically retightened with the vehicle empty.	T	F
6	If a shock absorber on the front axle is leaking, the proper procedure is to replace the defective shock absorber.	T	F
7	Worn bushings in a tandem rear-axle suspension can cause drive-shaft vibration.	T	F
8	When a vehicle wanders while driving on level road, the probable cause is too much negative chamber.	T	F
9	To center the steering wheel on a vehicle all you have to do is remove the steering wheel and re-install it.	T	F
10	Too much negative caster on the front wheel will cause the vehicle to pull to the left.	T	F

	HYDRAULICS		
1	Hydraulic pumps produce flow not pressure.	T	F
2	A pump usually activates because of a restricted inlet or other conditions that allow air spaces to develop in the incoming fluid.	T	F

3	Improper condition of the hydraulic fluid can cause pump failure.	T	F
4	Pressure control valves are used to limit system pressure.	T	F
5	A check valve is a directional control.	T	F
6	Cylinders convert mechanical power to fluid power.	T	F
7	Misalignment of piston rods can cause leaks.	T	F
8	Oil of too high viscosity can cause a system to work sluggishly when cold and normal when the system warms up.	T	F
9	A pump can generally be used as a motor.	T	F
10	Galvanized pipe is recommended for high pressure hydraulic plumbing.	T	F
11	A hydraulic reservoir:		
	Stores oil	T	F
	Dissipates heat	T	F
	Helps keep oil clean	T	F
12	When trouble shooting a hydraulic system you should:		
	Know the system	T	F
	Operate the machine	T	F
	Inspect the machine	T	F
	Change parts until you find the trouble	T	F
	List the possible causes	T	F
	Reach a conclusion	T	F
	Test your conclusion	T	F
13	The valve that controls a packer blade is called a directional control valve.	T	F
14	A piston pump is a positive displacement pump.	T	F
15	A tall, narrow hydraulic reservoir is better than a short, wide one.	T	F
16	A swash plate is used in a external gear pump.	T	F
17	A typical hydraulic hose on a refuse truck contains two layers of wire braid.	T	F
18	The most common seal in mobil hydraulic systems is the “O” ring.	T	F
19	If you put equal pressure on both ends of a double acting cylinder it will not extend or retract.	T	F

	ELECTRICAL		
1	A bad starter relay could cause high starter current draw.	T	F
2	A volt is a measure of current flow.	T	F
3	A vehicle battery is a device for storing energy.	T	F
4	Battery hydrometer readings should be taken immediately after water has been added.	T	F
5	The need to add excessive water to a battery indicates the charging rate is too high.	T	F
6	Diodes can be damaged by an overheated alternator.	T	F
7	A relay is a device that opens or closes another electrical circuit.	T	F
8	The engine will not start if the polarity is reversed in an electrical system with an alternator.	T	F
9	It is ok to replace damaged wire with a lighter gauge wire.	T	F
10	A poor ground can cause lighting problems.	T	F
11	If the battery uses a great deal of water chances are it is being undercharged.	T	F
12	An ammeter measures current flow.	T	F
13	A voltmeter measures electrical pressure.	T	F

ELECTRICAL - CONTINUED

14	An ohmmeter measures resistance in a circuit.	T	F
15	A conductor is some thing or material that will conduct electricity.	T	F
16	The most common current used in a vehicle is alternating current.	T	F
17	A battery is a device for storing mechanical energy.	T	F
18	A battery hydrometer show the battery’s rated capacity.	T	F

19	The specifi c gravity of the electrolyte in a fully charged battery is usually 1.260-1.280.	T	F
20	Battery dyrometer readings should be taken when the engine is idling.	T	F
21	A dry-charged battery never needs electrolyte.	T	F
22	When replacing battery cables on tapered-type posts, it is good practice to coat terminals with petroleum jelly or grease.	T	F
23	If polarity is reversed in an electrical system with an alternator, the rectifier diodes will be ruined.	T	F
24	The need to add excessive water to a battery indicates excessive engine idling.	T	F
25	Weak brush-holder springs will cause brushes to short circuit.	T	F
26	A no cranking condition, with the lights staying bright, indicates an open circuit in the cranking system	T	F
27	An ammeter measures current flowing in an electric circuit.	T	F
28	An ohmmeter may be used for measuring voltage between two points in an electrical circuit.	T	F
29	A starter motor may be operated continuously for more than 90 seconds.	T	F
30	An electrical conductor is made of glass or plastic.	T	F
31	It is good practice to hammer battery cables terminals onto battery posts.	T	F
32	A voltmeter is always connected in series with a part of the circuit being tested.	T	F
33	An ohmmeter should never be connected to an external source of voltage.	T	F
34	High resistance in battery cables or connections is not a cause of slow or sluggish cranking.	T	F
35	A starter shifting in and out, or pulling in, is often caused by high resistance in the starter solenoid.	T	F
36	Voltage loss between the alternator and battery may be due to loss in the wiring.	T	F
37	Battery electrolyte is a solution of hydrochloric acid and water.	T	F
38	While cranking an engine the voltmeter reads low, this probably indicates a bad starter.	T	F
39	Both headlights are dim on high beam and normal on low beam. The probable cause is a poor headlight ground.	T	F
40	The specific gravity of a battery has been determined to be 1.200 @ 80 degrees F. The state of charge is 1/2 charged.	T	F
41	High starter draw could be caused by a bad starter relay.	T	F
42	In an alternator charging system, the output current is high when the battery is fully charged.	T	F
43	A starter motor should not be operated continuously for more than 60 seconds.	T	F
44	The starter motor draws electrical energy from the battery and converts it to kinetic energy.	T	F

EMPLOYEE RELATIONSHIPS: SAFETY

1	What workers really want is a supervisor who lets them loaf on the job, gives them regular pay raises, and lets them take off all the time they want.	T	F
2	Employees who are at the top of their grade are considered valuable employees to the organization.	T	F
3	A general employee can make a good management transition if they so desire.	T	F
4	Any communications between employees should be accurate, clear, impartial and you should expect some misunderstanding.	T	F

5	If you are giving instructions to a co-worker, make sure they ask questions to find out if the instructions are understood.	T	F
6	In many industrial organizations, competition between departments is considered healthy and is encouraged; but competition does not mean open conflict.	T	F
7	You will be a far better communicator if you know how to listen.	T	F
8	Being tardy is a common human failing, but is a very expensive business habit that should be allowed to continue.	T	F
9	Workers are expected to understand required standards and have the ability to meet those standards in their daily work environment.	T	F
10	A dirty work area provides not only a hazard to the workers but is certain to reduce quality and increase production costs.	T	F
11	Safety isn't simply important to the well being of workers, it is also an important factor in the cost of running the agency.	T	F
12	Human failure (unsafe acts) cause over three quarters of all accidents on the job.	T	F
13	Class C fire extinguishers were developed for small fires involving electrical wiring, controls, panels, and motors.	T	F
	SHOP TOOLS		
1	A torque wrench measures the size of a nut.	T	F
2	A chassis dynamometer is an electronic analyzer.	T	F
3	A good tool for checking a cooling system is a radiator and pressure-cap tester.	T	F
4	A feeler gauge is recommended for checking tread depth of tires.	T	F
5	A tire-infl ation cage prevents slow leaks in tires.	T	F
	DIESEL ENGINES		
1	A diesel engine is an external combustion engine.	T	F
2	Actual compression pressure in a diesel engine is approximately 300 psi.	T	F
3	The same amount of air always enters the cylinders of a diesel engine; the amount of fuel is varied to increase proportion of fuel to air.	T	F
4	Centane number is a measure of a guide to a fuel price.	T	F
5	"Waxing" of diesel fuel is caused by agglomeration of paraffi n particles found in all diesel fuel, which congeal at low temperatures.	T	F
6	The "cloud point" of a diesel fuel is any temperature below freezing.	T	F
7	Ether is used as a starting aid for diesel engines because it ignites at low temperatures.	T	F
8	The purpose of an after-cooler is to reduce intake-air noise.	T	F
9	Fuel injection occurs well before the piston reaches top dead center on the compression stroke. The reason is to vent air from the fuel-injection system.	T	F
10	To obtain easier starting in cold weather, diesel fuel can be mixed with kerosene.	T	F
11	A consistent engine miss at all speeds, with smoke puff s at every revolution, is caused by a sticking injector nozzle.	T	F

	DIESEL ENGINES - CONTINUED		
12	A diesel engine converts the greatest percentage of energy to useful work power.	T	F
13	Fuel and air are mixed in the supercharger on a diesel engine.	T	F
14	The typical compression on a diesel engine is 8.5-1.	T	F
15	The actual compression pressure on a diesel engine is approximately 200 psi.	T	F
16	The purpose of an after-cooler on a diesel engine is to increase combustion efficiency and power.	T	F
17	A sticking nozzle can cause a diesel to miss at all speeds.	T	F
18	The rack on a Detroit diesel engine must be set with the engine running.	T	F
19	Cummins engines use a P.T. injection system.	T	F

20	The compression release on a Cummins engine operates by holding the valves open.	T	F
21	Sleeve protussion is the distance the sleeve protrudes into the crankcase.	T	F
22	When using a micrometer, one full turn represents .100.	T	F
23	On a two-cycle diesel engine, it takes two crankshaft revolutions to complete one combustion cycle.	T	F
24	A naturally aspirated diesel increases in power with increased elevation.	T	F
25	Diesel engine turbochargers are driven by a gear on the crankshaft.	T	F
26	A dirty or partially clogged air cleanser causes increased smoke and reduced power.	T	F

AIR BRAKES			
1	When one diagram in the chambers on the same axle fails, both need to be replaced to maintain uniform push-rod length.	T	F
2	Excessive oil in an air brake system is probably caused by worn compressor piston rings.	T	F
3	With the air brakes correctly adjusted and fully applied, the angle between the push rod and the lever should be slightly greater than 90 degrees.	T	F
4	Mechanics should avoid adding 90 degree elbow fittings to the air brake system, adding four elbows is equivalent to 28 feet of hose.	T	F
5	Brake drums that are cracked through the drum, will make one more trip before needing replacing. (ok by C.H.P.).	T	F
6	Dash air gauges can always be relied upon to be accurate.	T	F
7	Air loss of more than two pounds per minute, with brakes released on a single vehicle, is a violation of the C.H.P. inspection Program.	T	F
8	Brake drag has been traced to poor housekeeping on the floor of the truck cab.	T	F
9	Stop light switches are always piped into a supply reservoir.	T	F
10	Most air brake devices operate on the principle of air pressure versus spring pressure.	T	F
11	The parking brake system receives its air supply from a protected reservoir for that system only.	T	F
12	Low pressure switches are always piped into the delivery or application lines.	T	F
13	Maximum stroke at which a type 30 brake chamber should be adjusted is two inches.	T	F
14	A temporary repair of a brake hose using a piece of tubing and hose clamps is permissible.	T	F
15	Brake hoses must be replaced if worn, chaffed, cut or cracked through the outer cover.	T	F
16	The air governor's sole function is to tell the air compressor when to pump and when to shut off.	T	F
17	By state law, all brake lining to be used on all autos, trucks, trailers and buses must have an edge code plainly visible showing manufacturers code and friction vault, cold and hot.	T	F
18	Air dryers clean and dry the air before it reaches the compressor.	T	F
19	When vehicles are not equipped with air dryers or automatic drain vavles, drivers or someone should be instructed to drain the wet tank daily or at least once a week.	T	F

AIR BRAKES CONTINUED			
20	Single system foot valves and dual system foot vavles may be interchaged on the same vehicle without any problems whatsoever.	T	F
21	Kinked or plugged air compressor discharge lines have been known to cause a pressure build-up so great the cylinder block will be lifted off the crankcase of the compressor and completely destroy the compressor	T	F
22	The source of air in the air brake system is the governor	T	F
23	If the water is not drained from air system tanks, it will displace needed air tank capacity.	T	F
24	The front-axle brake limiting valve is designed to give better vehicle control on slippery roads.	T	F
25	trucks is to speed up the operation of the rear brakes.	T	F
26	Excessive oil in the air brake system is probably caused by engine oil pressure being too high.	T	F

COOLING SYSTEM			
1	The maximum freezing protection with a mixture of ethylene glycol and water is obtained with a mixture of 33 1/2% ethylene glycol and 75% water.	T	F
2	The function of a thermostat is to prevent overheating.	T	F
3	When a thermostat fails in the open position the engine runs too hot.	T	F
4	A thermostat installed backwards will cause the engine to run at a lower than normal temperature.	T	F
5	The maximum freezing protection is obtained by a mixture of ethylene glycol and water at the rate of 50% antifreeze and 50% water.	T	F
6	A device for regulating current by means of variable resistance is called a voltage limiter.	T	F
7	Long wire runs, such as from a tractor to trailer taillights, can result in a voltage drop that can be partially or entirely overcome by using heavier-gauge wire.	T	F
8	If a vehicle ammeter shows “charge” when the headlights are turned on after a battery replacement, it	T	F
9	The best freezing and cooling protection is obtained with 100% ethylene glycol in the radiator.	T	F

HYDRAULIC BRAKES			
1	A “split” hydraulic brake system is two separate systems with a duel master cylinder.	T	F
2	Hydraulic-brake parts should be cleaned with gasoline.	T	F
3	When brake drums have been machined (turned) to the maximum limit specified by the vehicle manufacturer or state law, and additional machining is needed to true the drum, it should be exchanged for a rebuilt drum.	T	F
4	If a brake pedal rises and falls or pulsates when brakes are applied, the probable cause is glazed linings.	T	F
5	On a vehicle with disc/drum brakes, the front brakes grab quickly when light pedal pressure is applied. This problem could be caused by a bad proportioning valve.	T	F
6	The purpose of the bar on rear brake applications is to force the shoes into the drum when the parking brakes are applied.	T	F
7	If a hydraulic brake line is leaking, the correct repair would be to replace the leaking line with double flared steel tubing.	T	F

GASOLINE ENGINES			
1	The correct firing order of an in-line six-cylinder engine is 1-5-3-6-4-2.	T	F
2	A cracked or loose intake manifold causes a noticeable drop in oil pressure.	T	F
3	To start a cold engine, a major requirement is a high carburetor-float level.	T	F
4	An increase in compression when heavy oil is put into a cylinder during a compression test indicates worn piston rings.	T	F
5	A piston’s size is measured across the top.	T	F
6	A vacuum gauge is useful for analyzing fuel-air ratio.	T	F
7	A recommended tool for measuring the diameter of an engine cylinder is an inside caliper.	T	F
8	A feeler gauge is recommended for checking tread depth of tires.	T	F
9	If piston rings are installed upside down you will have increased oil consumption.	T	F
10	Main bearing oil clearance can be checked with a feeler gauge.	T	F
11	Worn valve guides will cause excessive oil consumption.	T	F

12	A compression test on a in line six-cylinder engine indicates #3 and #4 have 10 psi. The rest all read 130-135 psi. This could be caused by wrong valve timing.	T	F
13	The device used to check ignition timing, with the engine running, is a xenon timing light.	T	F
14	If a timing light flashes before the timing mark lines up with the pointer, the time is too late.	T	F
15	If the timing mark fluctuates, it can indicate a badly worn condenser.	T	F
16	After operation in an engine, the color of the center insulator of a spark plug with the correct hear range should be black.	T	F
17	The distributor points are connected to the primary-coil winding.	T	F
18	The condenser points are connected to the primary-coil winding.	T	F
19	A compression test shows one cylinder very low; when an air-line is connected to that cylinder with a spark plug-hole adapter, air leakage can be heard at the tailpipe. The cause is probably broken piston rings.	T	F
20	The exhaust stroke of the piston fills the cylinder with a combustible mixture of air and fuel.	T	F
21	A carburetor operates on the principle of Ohm's law.	T	F
22	A high fuel level in a carburetor bowl will cause the engine to stall.	T	F
23	A dirty or partially clogged air cleaner will decrease fuel efficiency.	T	F
24	Exhaust-gas recirculation (EGR) is designed to reduce combustion temperature for low Nox emissions.	T	F
25	A catalytic converter prevents fuel-line "vapor lock."	T	F
26	The EGR valve reduces combustion chamber temperatures.	T	F

SWANA MECHANICS' ROAD-E-O
PRATICE TEST ANSWER KEY
SHOP SAFETY
1 Eye protection is optional if you are using a protective shield. F
2 Eye protection should be worn during cleaning operations with compressed air. T
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18 The most common seal in mobil hydraulic systems is the “O” ring. T

19 If you put equal pressure on both ends of a double acting cylinder it will not extend or retract. F
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22 When replacing battery cables on tapered-type posts, it is good practice to coat terminals with petroleum
jelly or grease.
T

23 If polarity is reversed in an electrical system with an alternator, the rectifi er diodes will be ruined. F
24 The need to add excessive water to a battery indicates excessive engine idling. F
25 Weak brush-holder springs will cause brushes to short circuit. F
26 A no cranking condition, with the lights staying bright, indicates an open circuit in the cranking system. T
27 An ammeter measures current fl owing in an electric circuit. T

28 An ohmmeter may be used for measuring voltage between two points in an electrical circuit. F
29 A starter motor may be operated continuously for more than 90 seconds. F
30 An electrical conductor is made of glass or plastic. F
31 It is good practice to hammer battery cables terminals onto battery posts. F
32 A voltmeter is always connected in series with a part of the circuit being tested. F
33 An ohmmeter should never be connected to an external source of voltage. T

34 High resistance in battery cables or connections is not a cause of slow or sluggish cranking. F
35 A starter shifting in and out, or pulling in, is often caused by high resistance in the starter solenoid. F
36 Voltage loss between the alternator and battery may be due to loss in the wiring. T
37 Battery electrolyte is a solution of hydrochloric acid and water. F
38 While cranking an engine the voltmeter reads low, this probably indicates a bad starter. F
39 Both headlights are dim on high beam and normal on low beam. The probable cause is a poor headlight
ground.
T
40 The specifi c gravity of a battery has been determined to be 1.200 @ 80 degrees F. The state of charge is 1/2
charged.
T
41 High starter draw could be caused by a bad starter relay. F

42 In an alternator charging system, the output current is high when the battery is fully charged. F
43 A starter motor should not be operated continuously for more than 60 seconds. T

44 The starter motor draws electrical energy from the battery and converts it to kinetic energy. T

SHOP TOOLS
1 A torque wrench measures the size of a nut. F
2 A chassis dynamometer is an electronic analyzer. F
3 A good tool for checking a cooling system is a radiator and pressure-cap tester. T
4 A feeler gauge is recommended for checking tread depth of tires. F
5 A tire-infl ation cage prevents slow leaks in tires. F
DIESEL ENGINES
1 A diesel engine is an external combustion engine. F
2 Actual compression pressure in a diesel engine is approximately 300 psi. F

3 The same amount of air always enters the cylinders of a diesel engine; the amount of fuel is varied to increase proportion of fuel to air.
F
4 Centane number is a measure of a guide to a fuel price. F

5 “Waxing” of diesel fuel is caused by agglomeration of paraffi n particles found in all diesel fuel, which congeal at low temperatures.
T
6 The “cloud point” of a diesel fuel is any temperature below freezing. F
7 Ether is used as a starting aid for diesel engines because it ignites at low temperatures. T
8 The purpose of an after-cooler is to reduce intake-air noise. F
EMPLOYEE RELATIONSHIPS: SAFETY
1 What workers really want is a supervisor who lets them loaf on the job, gives them regular pay raises, and
lets them take off all the time they want.
F
2 Employees who are at the top of their grade are considered valuable employees to the organization.
T
3 A general employee can make a good management transition if they so desire. F
4 Any communications between employees should be accurate, clear, impartial and you should expect some
misunderstanding.
T
5 If you are giving instructions to a co-worker, make sure they ask questions to fi nd out if the instructions are
understood.
T

6 In many industrial organizations, competition between departments is considered healthy and is encouraged; but competition does not mean open confl ict.
T
7 You will be a far better communicator if you know how to listen. T
8 Being tardy is a common human failing, but is a very expensive business habit that should be allowed to
continue.
F

9 Workers are expected to understand required standards and have the ability to meet those standards in
their daily work environment.
T
10 A dirty work area provides not only a hazard to the workers but is certain to reduce quality and increase
production costs.
T
11 Safety isn't simply important to the well being of workers, it is also an important factor in the cost of running
the agency.
T
12 Human failure (unsafe acts) cause over three quarters of all accidents on the job. T
13 Class C fi re extinguishers were developed for small fi res involving electrical wiring, controls, panels and
motors.
T

9 Fuel injection occurs well before the piston reaches top dead center on the compression stroke. The reason
is to vent air from the fuel-injection system.
F
10 To obtain easier starting in cold weather, diesel fuel can be mixed with kerosene. F
11 A consistent engine miss at all speeds, with smoke puff s at every revolution, is caused by a sticking injector
nozzle.
F
12 A diesel engine converts the greatest percentage of energy to useful work power. T
13 Fuel and air are mixed in the supercharger on a diesel engine. F
14 The typical compression on a diesel engine is 8.5-1. F
15 The actual compression pressure on a diesel engine is approximately 200 psi. F

16 The purpose of an after-cooler on a diesel engine is to increase combustion effi ciency and power. T
17 A sticking nozzle can cause a diesel to miss at all speeds. T
18 The rack on a Detroit diesel engine must be set with the engine running. F
19 Cummins engines use a P.T. injection system. T
20 The compression release on a Cummins engine operates by holding the valves open. T
21 Sleeve protussion is the distance the sleeve protrudes into the crankcase. F
22 When using a micrometer, one full turn represents .100. F
23 On a two-cycle diesel engine, it takes two crankshaft revolutions to complete one combustion cycle.
F
24 A naturally aspirated diesel increases in power with increased elevation. F
25 Diesel engine turbochargers are driven by a gear on the crankshaft. F
26 A dirty or partially clogged air cleanser causes increased smoke and reduced power. T
AIR BRAKES
1 When one diagram in the chambers on the same axle fails, both need to be replaced to maintain uniform
push-rod length.
F

2 Excessive oil in an air brake system is probably caused by worn compressor piston rings. T
3 With the air brakes correctly adjusted and fully applied, the angle between the push rod and the lever
should be slightly greater than 90 degrees.
F
4 Mechanics should avoid adding 90 degree elbow fi ttings to the air brake system, adding four elbows is
equivalent to 28 feet of hose.
T
5 Brake drums that are cracked through the drum, will make one more trip before needing replacing (ok by
C.H.P.).
F
6 Dash air gauges can always be relied upon to be accurate. F
7 Air loss of more than two pounds per minute, with brakes released on a single vehicle, is a violation of the
C.H.P. inspection program.
F
8 Brake drag has been traced to poor housekeeping on the fl oor of the truck cab. T
9 Stop light switches are always piped into a supply reservoir. F
10 Most air brake devices operate on the principle of air pressure versus spring pressure. T

11 The parking brake system receives its air supply from a protected reservoir for that system only. F
12 Low pressure switches are always piped into the delivery or application lines. F
13 Maximum stroke at which a type 30 brake chamber should be adjusted is two inches. T

14 A temporary repair of a brake hose using a piece of tubing and hose clamps is permissible. F
15 Brake hoses must be replaced if worn, chaff ed, cut or cracked through the outer cover. T

16 The air governor’s sole function is to tell the air compressor when to pump and when to shut off . T
17 By state law, all brake lining to be used on all autos, trucks, trailers and buses must have an edge code
plainly visible showing manufacturers code and friction vault, cold and hot.
F

18 Air dryers clean and dry the air before it reaches the compressor. F
19 When vehicles are not equipped with air dryers or automatic drain valves, drivers or someone should be
instructed to drain the wet tank daily or at least once a week.
T
20 Single system foot valves and dual system foot valves may be interchanged on the same vehicle without
any problems whatsoever.
F
21 Kinked or plugged air compressor discharge lines have been known to cause a pressure build-up so great
the cylinder block will be lifted off the crankcase of the compressor and completely destroy the compressor.
T

22 The source of air in an air brake system is the governor. F

23 If the water is not drained from air system tanks, it will displace needed air tank capacity. T

24 The front-axle brake limiting valve is designed to give better vehicle control on slippery roads. T
25 The main reason for locating a relay valve near the rear wheel brake chambers on long wheel base trucks is
to speed up the operation of the rear brakes.
T

26 Excessive oil in the air brake system is probably caused by engine oil pressure being too high. F
COOLING SYSTEM
1 The maximum freezing protection with a mixture of ethylene glycol and water is obtained with a mixture of
33 1/2% ethylene glycol and 75% water.
F
2 The function of a thermostat is to prevent overheating. T
3 When a thermostat fails in the open position the engine runs too hot. F

4 A thermostat installed backwards will cause the engine to run at a lower than normal temperature. F
5 The maximum freezing protection is obtained by a mixture of ethylene glycol and water at the rate of 50%
antifreeze and 50% water.
F
6 A device for regulating current by means of variable resistance is called a voltage limiter. F
7 Long wire runs, such as from a tractor to trailer taillights, can result in a voltage drop that can be partially or
entirely overcome by using heavier-gauge wire.
T
8 If a vehicle ammeter shows “charge” when the headlights are turned on after a battery replacement, it
indicates a fuse in the charging circuit is blown.
F

9 The best freezing and cooling protection is obtained with 100% ethylene glycol in the radiator. F
HYDRAULIC BRAKES
1 A “split” hydraulic brake system is two separate systems with a duel master cylinder. T
2 Hydraulic-brake parts should be cleaned with gasoline. F

3 When brake drums have been machined (turned) to the maximum limit specifi ed by the vehicle manufacturer or state law, and additional machining is needed to true the drum, it should be exchanged for
a rebuilt drum.
F
4 If a brake pedal rises and falls or pulsates when brakes are applied, the probable cause is glazed linings. F
5 On a vehicle with disc/drum brakes, the front brakes grab quickly when light pedal pressure is applied. This
problem could be caused by a bad proportioning valve.

T
6 The purpose of the bar on rear brake applications is to force the shoes into the drum when the parking
brakes are applied.
T
7 If a hydraulic brake line is leaking, the correct repair would be to replace the leaking line with double fl ared
steel tubing.
T

GASOLINE ENGINES
1 The correct fi ring order of an in-line six-cylinder engine is 1-5-3-6-4-2. F
2 A cracked or loose intake manifold causes a noticeable drop in oil pressure. F
3 To start a cold engine, a major requirement is a high carburetor-fl oat level. F
4 An increase in compression when heavy oil is put into a cylinder during a compression test indicates worn piston rings.
T
5 A piston's size is measured across the top. F
6 A vacuum gauge is useful for analyzing fuel-air ratio. F

7 A recommended tool for measuring the diameter of an engine cylinder is an inside caliper. F
8 A feeler gauge is recommended for checking tread depth of tires. F
9 If piston rings are installed upside down you will have increased oil consumption. T
10 Main bearing oil clearance can be checked with a feeler gauge. F
11 Worn valve guides will cause excessive oil consumption. T
12 A compression test on a in line six-cylinder engine indicates #3 and #4 have 10 psi. The rest all read 130-135
psi. This could be caused by wrong valve timing.
F

13 The device used to check ignition timing, with the engine running, is a xenon timing light. T

14 If a timing light fl ashes before the timing mark lines up with the pointer, the time is too late. F
15 If the timing mark fl uctuates, it can indicate a badly worn condenser. F
16 After operation in an engine, the color of the center insulator of a spark plug with the correct hear range
should be black.
F
17 The distributor points are connected to the primary-coil winding. T
18 The condenser points are connected to the primary-coil winding. F
19 A compression test shows one cylinder very low; when an air-line is connected to that cylinder with a spark

plug-hole adapter, air leakage can be heard at the tailpipe. The cause is probably broken piston rings.
F

20 The exhaust stroke of the piston fi lls the cylinder with a combustible mixture of air and fuel. F
21 A carburetor operates on the principle of Ohm's law. F
22 A high fuel level in a carburetor bowl will cause the engine to stall. F

23 A dirty or partially clogged air cleaner will decrease fuel effi ciency. T
24 Exhaust-gas recirculation (EGR) is designed to reduce combustion temperature for low NOx emissions. T
25 A catalytic converter prevents fuel-line “vapor lock.” F
26 The EGR valve reduces combustion chamber temperatures. T