

Plumber

Practice Interprovincial Red Seal Exam

Disclaimer: This is NOT an Interprovincial Standards (Red Seal) Examination. This is a practice examination that has been developed using similar weighting, question distribution, question taxonomies and question styles to that of a red seal examination. Success on this examination will NOT result in certification or qualification. This examination is intended to be used for self assessment in preparation for attempting a red seal examination. More information about the standard that the red seal examination is based may be found within the National Occupational Analysis for the occupation at www.red-seal.ca .

Section 1

OCCUPATIONAL SKILLS

1. What is the definition of a Class B fire?
 - A. Fires involving common combustibles such as wood, paper, cloth, rubber and trash.
 - B. Fires involving flammable liquids, gases, gasoline and synthetic or oil-based products.
 - C. Fires that involve energized electrical equipment, such as wiring, controls, motors or appliances.
 - D. Fires that involve combustible metals such as magnesium and sodium.

2. What sling configuration would be rated with the most capacity for a lifting procedure?
 - A. Single vertical leg.
 - B. Choker with single vertical leg.
 - C. Basket sling with 2 vertical legs.
 - D. Basket sling with 2 inclined vertical legs.

EQUIPMENT LIST			MECHANICAL SERVICES						
No	Description	Qty	Water		Waste	Gas		Exhaust	
			HW	CW	Size	MBH	Size	CFM	Size
101	Combi-oven c/w stand	2		19	50	92	13		
102	Faucet for item # 103	1	13	13					
103	Triple Compartment pot sink	1			50				
165	Freezer Coil	3		19					
167	Exhaust Canopy w/wall cladding	2			50			2250	254 x 457
179	Tilting Skillet	1	13	13	50	91	19		
195	Steamer	1		2 @ 13	38	240	19		
210	Two-oven range w/6 top burners	2				275	32		
213	Wash down control cabinet	1	25	13					
227	Hand wash sink	2	13	13	38				
258	Stacking Ovens (moisture +)	2		2 @ 6	2 @ 25	80	2 @ 19		
295	Steamer	1		2 @ 19		385	25		

Figure 1

3. Refer to Figure 1. What is the size of gas supply line for the Steamer (item #195)?
 - A. 13 mm
 - B. 19 mm
 - C. 25 mm
 - D. 32 mm

4. Refer to Figure 1. What is the size of the cold water supply piping required for the stacking oven (item #258)?
 - A. 6 mm
 - B. 13 mm
 - C. 19 mm
 - D. 25 mm

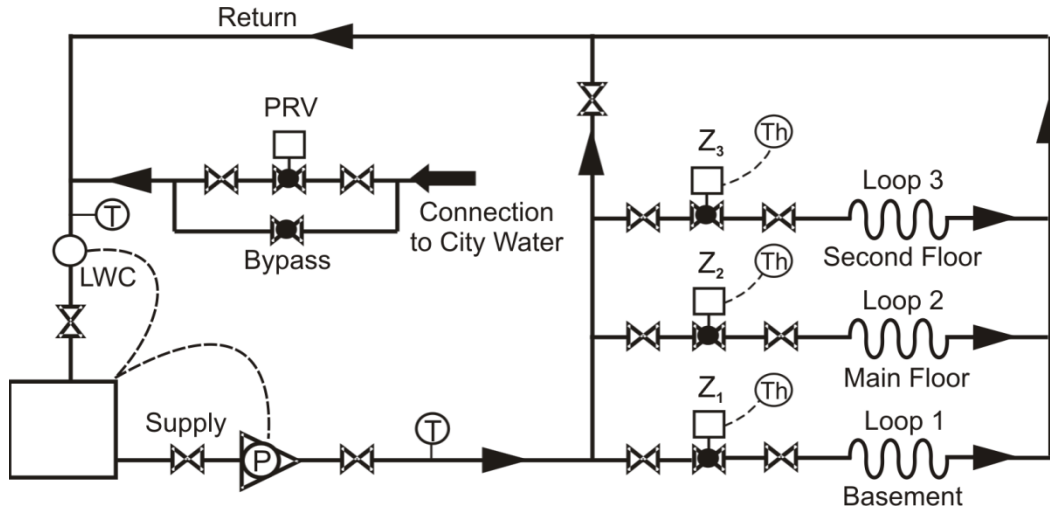


Figure 2

5. Refer to Figure 2. How many ball valves must be ordered to assemble the system shown?
- A. 10
 - B. 12
 - C. 13
 - D. 14
6. What procedure is used to determine if additional PPE is required for a specific task on a jobsite?
- A. Ask the site foreman.
 - B. Complete a hazard assessment.
 - C. Observe what other workers are wearing.
 - D. Request information at next tool box meeting.

7. A 4" diameter stainless steel pipe is 26.5 m (86.9 feet) in length and requires hangers to be placed at 1.6 m (5.25 feet) intervals. How many hangers are required to support the pipe with hangers at both ends of the run?

- A. 16
- B. 17
- C. 18
- D. 19

8. A 6" NPS (150 mm) cast iron soil pipe with a 1/4" (6 mm) wall thickness requires a sleeve. What is the minimum inside diameter of the sleeve required?

- | | Metric | | Imperial |
|----|--------|----|----------|
| A. | 150 mm | A. | 6" |
| B. | 156 mm | B. | 6 1/4" |
| C. | 162 mm | C. | 6 1/2" |
| D. | 212 mm | D. | 8 1/2" |

9. What is the minimum ground cover for underground gas piping?

- | | Metric | | Imperial |
|----|--------|----|----------|
| A. | 300 mm | A. | 12" |
| B. | 400 mm | B. | 16" |
| C. | 450 mm | C. | 18" |
| D. | 600 mm | D. | 24" |

10. What sequence of plumbing procedures applies before a plumbing system is covered?

- A. Install, test, inspect and obtain a permit.
- B. Obtain a permit, install, test and inspect.
- C. Install, test, obtain a permit and inspect.
- D. Obtain a permit, install, inspect and test.

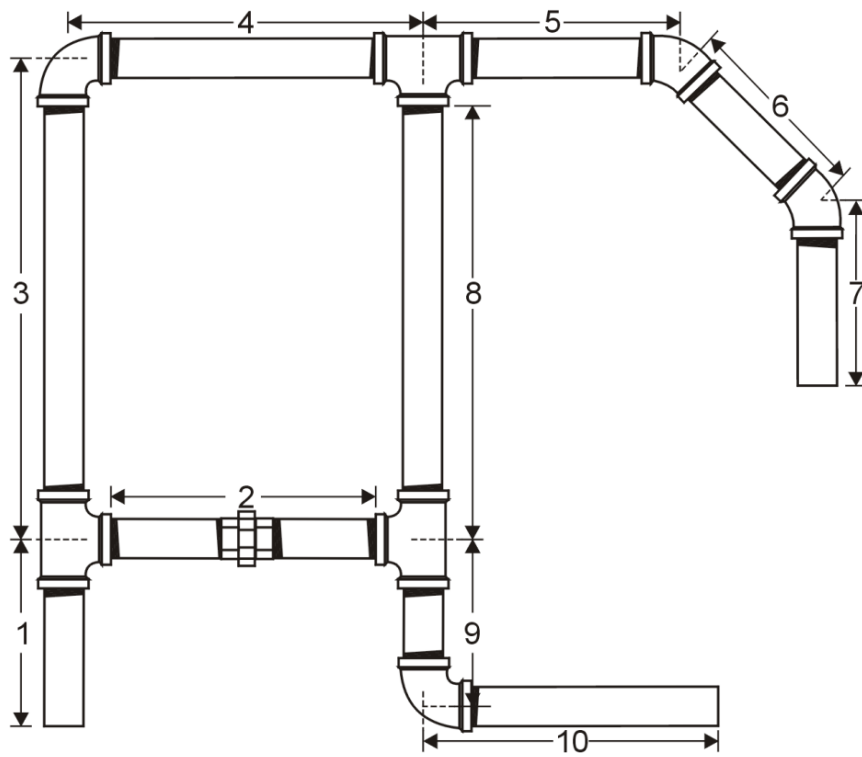
11. What piping installation would require a “fire donut”?
- A. DWV copper passing through fire rated floor.
 - B. Cast iron passing through fire rated wall.
 - C. ABS piping passing through fire rated ceiling.
 - D. Ductile iron passing through a fire rated floor.

Section 2

PIPING PREPARATION AND ASSEMBLY

12. Which procedure would correct a tube cutter that is spiraling along the copper pipe?
- A. Change the cutter wheel to a larger size.
 - B. Tighten rollers and cutter wheel pins.
 - A. Increase the cutter wheel tension when cutting.
 - B. Rotate only in a counter clockwise motion.
13. What is the purpose of the notched wheel rollers on a copper tube cutter?
- A. Allow room for the pipe to displace when cut.
 - B. Make a space for cutting materials to collect.
 - C. Flex slightly and prevent the crushing of the tube.
 - D. To permit the cutting of tubing close to a flare.
14. Which procedure and weight of tube would ensure a continuous 90 degree bend without crimping the tube?
- A. Use an external spring bender and type M copper tube.
 - B. Use a lever style tube bender and type L copper tube.
 - C. Hand bending using a minimum of type M copper tube.
 - D. Swedge using a minimum of type L copper tube.
15. Using the correct heating process, what would cause the solder to bead up and fall off the copper tube and fitting instead of penetrating the joint during the soldering process?
- A. The inside of the pipe was not cleaned.
 - B. There was no flux applied to tube and fitting.
 - C. There was not enough heat applied.
 - D. The solder has too low of a melting point.

16. A length of 3 in. ABS pipe is to be installed between two 45° elbows. The centre to centre dimension between the 45° elbows is $55\frac{1}{2}$ " and the fitting allowance for a 45° elbow is $\frac{15}{16}$ ". What is the cut length of the ABS pipe required?
- A. $52\frac{1}{2}$ "
 - B. $52\frac{7}{8}$ "
 - C. $54\frac{3}{16}$ "
 - D. $55\frac{1}{2}$ "
17. What steps are followed to join bell and spigot plastic pipe in a drainage system?
- A. Cut pipe square, lubricate outside of pipe and inside of fitting and push pipe together using a push bar or shovel.
 - B. Cut pipe square apply solvent and primer to outside of pipe and inside of fitting and push pipe together using a push bar or shovel
 - C. Cut pipe square, ream inside and outside surfaces of pipe, apply solvent and primer to outside of pipe and inside of fitting and push pipe together using a push bar or shovel.
 - D. Cut pipe square, ream inside and outside surfaces of pipe, lubricate outside of pipe and inside of fitting and push pipe together using a push bar or shovel.
18. What safe work procedures should be followed when working with PVC solvent cements and primers inside an enclosed building?
- A. Wear leather palmed gloves and only cut a small hole in the lid of the containers large enough for the brush required to dispense materials.
 - B. Wear cotton gloves, cut a small hole in the lid of the containers large enough for the brush required to dispense materials and ventilate area as needed.
 - C. Keep containers tightly closed when not in use, open only when brush is to be used to dispense primer or solvent cement and ventilate area.
 - D. Wear approved gloves, keep containers tightly closed when not in use, open only when brush is to be used to dispense primer or solvent cement and ventilate area.



Metric	Throw	Thread Engagement	Fitting Allowance
90° ELL	57 mm	19 mm	38 mm
45° ELL	43 mm	19 mm	24 mm
TEE	57 mm	19 mm	38 mm
Size of Line = 50 mm			

Figure 3

19. Refer to Figure 3. What is the cut length of pipe #5 if the centre to centre dimension is 940 mm?
- A. 840 mm
 - B. 864 mm
 - C. 878 mm
 - D. 902 mm

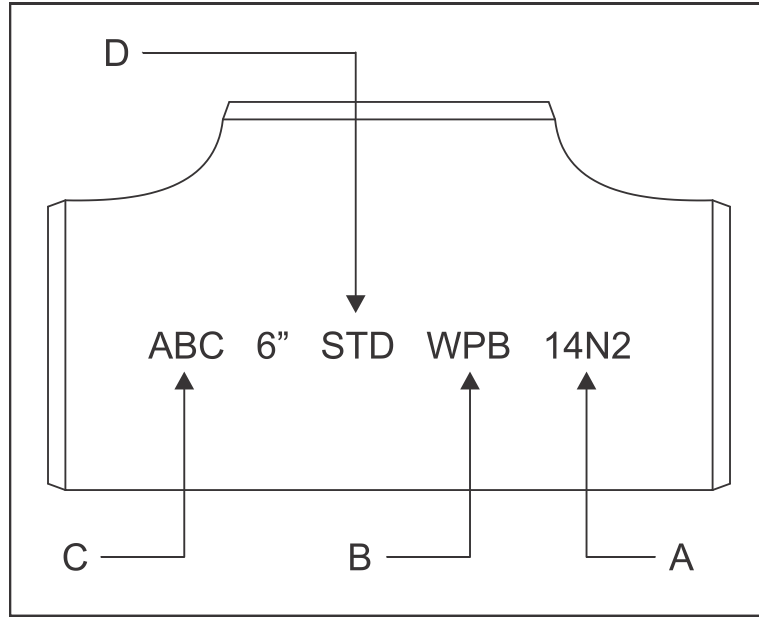


Figure 4

20. Refer to Figure 4. Which marking indicates the material designation for this tee?
- A. A
 - B. B
 - C. C
 - D. D
21. When laying out a gasket for an 8 hole flange what is the angle used to determine the bolt hole spacing?
- A. $22 \frac{1}{2}^{\circ}$
 - B. 30°
 - C. 45°
 - D. 90°

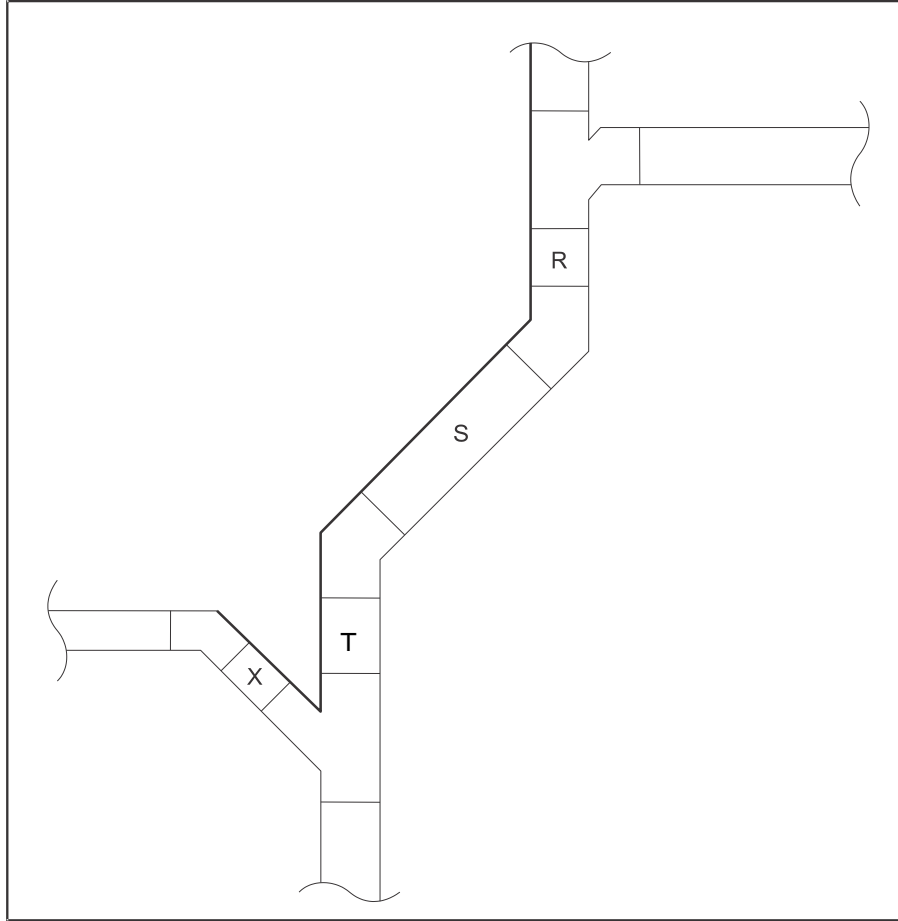


Figure 5

Fitting		Size	A	B	C	R
	in.	2	$1^{15/16}$	-	-	2
	mm	50	48	-	-	51
	in.	3	$2^{3/8}$	-	-	3
	mm	75	60	-	-	76
	in.	4	$2^{3/4}$	-	-	4
	mm	100	70	-	-	102
	in.	6	$3^{15/16}$	-	-	5
	mm	150	100	-	-	127
	in.	8	$5^{1/4}$	-	-	6
mm	200	133	-	-	152	

Figure 6

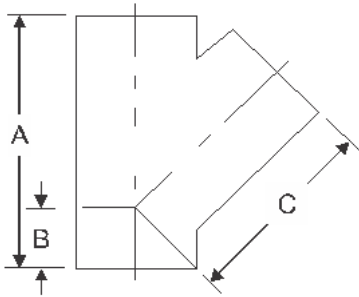
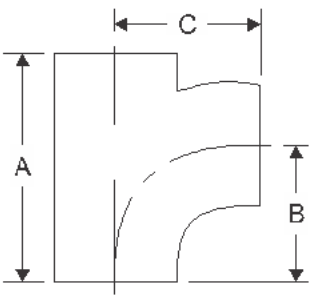
Fitting		Size	A	B	C	R
	in.	3 x 2	6 ³ / ₁₆	1 ³ / ₁₆	5 ³ / ₁₆	-
	mm	75 x 50	157	30	132	-
	in.	3 x 3	7 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	5 ³ / ₄	-
	mm	75 x 75	195	49	146	-
	in.	4 x 2	6 ¹ / ₂	7/ ₈	6 ³ / ₁₆	-
	mm	100 x 50	165	22	157	-
	in.	4 x 3	7 ⁵ / ₈	1 ⁷ / ₁₆	6 ⁷ / ₁₆	-
	mm	100 x 75	194	36	164	-
	in.	6 x 4	10 ⁵ / ₈	1 ⁹ / ₁₆	8 ⁵ / ₁₆	-
	mm	150 x 100	270	40	211	-
	in.	8 x 6	15 ¹ / ₂	3 ¹ / ₄	12 ¹ / ₄	-
	mm	200 x 150	394	83	311	-
		Size	A	B	C	R
	in.	3 x 2	5 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₂	-
	mm	75 x 50	141	78	89	-
	in.	3 x 3	7	4 ¹ / ₈	4 ¹ / ₈	-
	mm	75 x 75	178	105	105	-
	in.	4 x 2	5 ¹ / ₂	3 ¹ / ₁₆	4 ¹ / ₁₆	-
	mm	100 x 50	140	78	103	-
	in.	4 x 3	7	4	4 ⁹ / ₁₆	-
	mm	100 x 75	178	102	116	-
	in.	6 x 4	9 ³ / ₄	5 ⁷ / ₈	5 ⁷ / ₈	-
mm	150 x 100	248	149	149	-	

Figure 6 (continued)

22. Refer to Figures 5 and 6. What is the cut length for the 4 in. cast iron pipe T if the centre to centre dimension between the 100 mm x 50 mm (4 in. x 2 in.) Y and the 45° elbow is 991 mm (39 in.)?

	Metric	Imperial
A.	756 mm	29 ³ / ₄ in.
B.	764 mm	30 ¹ / ₁₆ in.
C.	778 mm	30 ⁵ / ₈ in.
D.	899 mm	35 ³ / ₈ in.

23. What is the minimum depth of cold caulking compound required for a 150 mm (6 in.) cast iron hub and spigot joint in an underground drainage system?

- | | Metric | | Imperial |
|----|--------|----|--------------------|
| A. | 20 mm | A. | $\frac{3}{4}$ in. |
| B. | 25 mm | B. | 1 in. |
| C. | 38 mm | C. | $1\frac{1}{2}$ in. |
| D. | 150 mm | D. | 6 in. |

24. What is the process for assembling a field cut piece of glass pipe to a factory beaded piece of glass pipe?

- A. Remove roughness from outside of the field cut and use manufacturer's coupling designed for this application.
- B. Remove roughness from the outside of field cut and use a rubber coupling with stainless steel clamps.
- C. Heat and bead the field cut end of the pipe and use manufacturer's coupling designed for this application.
- D. Heat and bevel the field cut end of the pipe and use a rubber coupling with stainless steel clamps.

25. Where is 8 in. Class 1500 non-pressure Asbestos Cement sewer pipe allowed for installation?

- A. Above ground inside a building.
- B. Above ground in a venting system.
- C. Underground in a potable water system.
- D. Underground under a building.

Section 3

DRAINAGE, WASTE, VENTS AND PRIVATE SEWAGE DISPOSAL SYSTEMS

26. How is the base inside a “poured in place” sanitary manhole constructed?
- A. Graded from center of base to walls.
 - B. Level throughout.
 - C. Channeled in direction of flow.
 - D. Channeled away from direction of flow.
27. To protect drainage piping in a trench, what is the minimum cover to be placed and tamped?
- A. 150 mm above pipe.
 - B. 300 mm above pipe.
 - C. 150 mm below finished grade.
 - D. 300 mm below finished grade.
28. A 4” building sewer must run 75 m from the building to a manhole, at minimum grade, calculate the total fall on the line?
- A. 0.5 m
 - B. 0.75 m
 - C. 1.0 m
 - D. 1.5 m
29. Using a builder’s level the backsight reading at the benchmark is 1.450 m and the foresight reading at the destination point is 1.750 m. What is the elevation of the destination point if the benchmark elevation is 100.00 m?
- A. 101.450 m
 - B. 101.750 m
 - C. 99.750 m
 - D. 99.700 m

30. Which table from the National Plumbing Code is used to determine the size of a storm building sewer?
- A. 2.4.10.9
 - B. 2.4.10.6.A
 - C. 2.4.10.6.B
 - D. 2.4.10.6.C
31. A combined building sewer has a hydraulic load of 345 fixture units and 9 280 litres of rain water. What is the minimum size of pipe required for a slope of 1 in 100?
- A. 4
 - B. 6
 - C. 8
 - D. 10
32. What procedure is used to determine soils ability to accept a private sewage disposal system?
- A. Sand in jar test.
 - B. Soil classification test.
 - C. Squirt test.
 - D. Soil saturation test.
33. What is done to prevent freezing of an (pumped) effluent line leaving the septic tank?
- A. Lower the effluent line below frost level.
 - B. Use more hot water in the building.
 - C. Install a frost box where more than 1.2 m of cover.
 - D. Increase the effluent line one pipe size.

34. What is the purpose of installing a screen around an effluent pump in a septic tank?
- A. Prevents the pump from plugging.
 - B. Prevents solids from entering the gravity distribution.
 - C. Prevents solids from entering the pressure distribution.
 - D. Prevents solids from entering the effluent chamber.
35. What device controls the intervals at which effluent is discharged to a gravity fed distribution field?
- A. Float switch.
 - B. Pump control panel.
 - C. Bell and siphon.
 - D. Effluent diverter valve.
36. Percolation tests indicate that the soil in the area selected for a disposal field has a percolation rate of 92 minutes per inch. What type of effluent treatment system is required?
- A. Gravity effluent disposal system using perforated pipe.
 - B. Gravity effluent disposal system using chambers.
 - C. Pressure distribution into a chamber system.
 - D. Pressure distribution into a sand bed mound.
37. A three-piece basement plumbing rough-in includes a water closet, bathtub and lavatory. Determine the minimum size of wet vent to be installed?
- | | Metric | | Imperial |
|----|--------|----|-----------------------------------|
| A. | 32 mm | A. | 1 ¹ / ₄ in. |
| B. | 40 mm | B. | 1 ¹ / ₂ in. |
| C. | 50 mm | C. | 2 in. |
| D. | 75 mm | D. | 3 in. |

38. A double compartment kitchen sink is being replaced with a triple compartment kitchen sink. What drainage changes are necessary to complete the installation?
- A. Fixture outlet length cannot be less than 1.2 m (4').
 - B. Another plumbing trap and vent is required for the extra sink.
 - C. The fixture trap and fixture drain is to be one pipe size larger than largest sink outlet.
 - D. The garbage grinder must be installed in the middle compartment.
39. What is the minimum size of trap for a commercial dishwasher?
- A. 1¹/₄ in.
 - B. 1¹/₂ in.
 - C. 2 in.
 - D. 3 in.
40. When the building drain (BD) is located below the level of the adjoining street, which device is installed inside the building?
- A. A backflow preventer on the service.
 - B. A normally closed backwater valve on the BD.
 - C. A normally open backwater valve on the BD.
 - D. A normally open backwater valve on the weeping tile.
41. When installing 6 shower drains in a locker room, which piping arrangement would be most economical?
- A. Individual traps with individual vents.
 - B. Individual traps with a circuit and relief vent.
 - C. A running trap with an individual vent.
 - D. A running trap with a relief vent.

42. Which piping procedure is necessary to complete and terminate the venting of an oil interceptor?
- A. Connect them to the building plumbing vent system.
 - B. Terminate them outside the building at the same height.
 - C. Terminate them outside the building at a height difference of at least 300 mm (12”).
 - D. Tie them together outside the building 300 mm (12”) above grade.
43. A single family dwelling has water table problems and periodic flooding in the basement. A weeping tile system is recommended. What piping procedure is used to connect the weeping tile to the sanitary building drain?
- A. Connect the weeping tile directly to the sanitary building drain.
 - B. Connect the weeping tile through a normally closed backwater valve.
 - C. Connect the weeping tile with a trap and normally open backwater valve.
 - D. Connect the weeping tile through a trapped backwater valve.
44. A laser “light beam” is hitting below the target mounted in a drainage pipe. What is done to correct the drainage pipe grade?
- A. Lower the pipe.
 - B. Raise the pipe.
 - C. Adjust the target.
 - D. Move the laser.
45. What piping procedure is required for the venting of an oil interceptor?
- A. 2 vent pipes connected to same side of the interceptor.
 - B. 2 vent pipes terminated less than 2m above ground.
 - C. 1 vent pipe terminated less than 300mm above the other.
 - D. 2 vent pipes connected to the interceptor at opposite ends.

46. A plumbing vent serving a typical basement three piece plumbing rough-in has a developed length of 12 meters. What is the name and minimum size of this vent?
- A. 1¹/₄" continuous vent.
 - B. 1¹/₄" circuit vent.
 - C. 1¹/₂" continuous vent.
 - D. 1¹/₂" circuit vent.
47. A plumbing branch with 18 Fixture units (including 3 water closets) is discharging into a stack. What is the minimum size and name of the stack downstream of this connection?
- A. 3" soil stack.
 - B. 3" waste stack.
 - C. 4" soil stack.
 - D. 4" waste stack.
48. What is the order of installation, in the direction of flow, for the discharge line from a sewage sump?
- A. Connection to the sanitary sewer, union, shutoff valve and check valve.
 - B. Union, shutoff valve, check valve and connection to the sanitary system.
 - C. Union, check valve, shutoff valve and connection to the sanitary system.
 - D. Connection to the sanitary sewer, union, check valve and shutoff valve.
49. What is the approximate centre line rough-in dimension of a floor flange serving a standard water closet?
- A. 300 mm (12 in.) measured from the rough floor.
 - B. 300 mm (12 in.) measured from the finished floor.
 - C. 300 mm (12 in.) measured from the finished wall.
 - D. 300 mm (12 in.) measured from the rough wall.

50. Which plumbing item would be installed immediately downstream of an interceptor?
- A. Vent pipe.
 - B. Enzyme injection point.
 - C. Cleanout fitting.
 - D. Flow control orifice.
51. A 4" cast iron storm drainage system is 100 m (328') long and has a hanger on each end. How many hangers are required using the maximum allowable distance between supports?
- A. 33
 - B. 34
 - C. 35
 - D. 36
52. A vertical storm drainage pipe passes through a five storey building. How many floor supports are needed to meet minimum code requirements?
- A. 3 clevis hangers.
 - B. 3 riser clamps.
 - C. 4 clevis hangers.
 - D. 4 riser clamps.
53. A wall hung urinal is to be installed in a health care facility. What must be considered when installing the drainage piping?
- A. The maximum temperature of waste entering the drainage system.
 - B. The type of piping material used for the fixture drain and vent piping above the flood level rim.
 - C. The location of the cleanout above the fixture flood level rim.
 - D. The installation of a vacuum breaker backflow preventer.

54. What DWV piping procedure is acceptable if a manufacturer's expansion joint is not available for a 75 mm (3 in.) soil stack?
- A. Install a 1 m (3 ft.) offset before passing through the floor.
 - B. Install a 1.2 m (4 ft.) offset before passing through the floor.
 - C. Install a 1.5 m (5 ft.) offset before passing through the floor.
 - D. Install an MJ or similar rubber coupling before passing through the floor.
55. What information is considered to determine the minimum pipe size of a continuous vent?
- A. The length of the vent, number of fixture units and grade on piping.
 - B. The size of the largest trap served and total number of fixture units.
 - C. The size of the largest trap served, length of vent and number of fixture units.
 - D. The size of the largest trap served, length of vent, fixture units and grade on piping.

Section 4

WATER SERVICE AND DISTRIBUTION

56. When sizing a water service and distribution system, which variable will have the greatest effect on the available water pressure to a plumbing fixture?
- A. The length of the building.
 - B. The height of the building.
 - C. The total Fixture Unit load.
 - D. The size of the water service.

Refer to Figure 7 to answer questions 57 and 58.

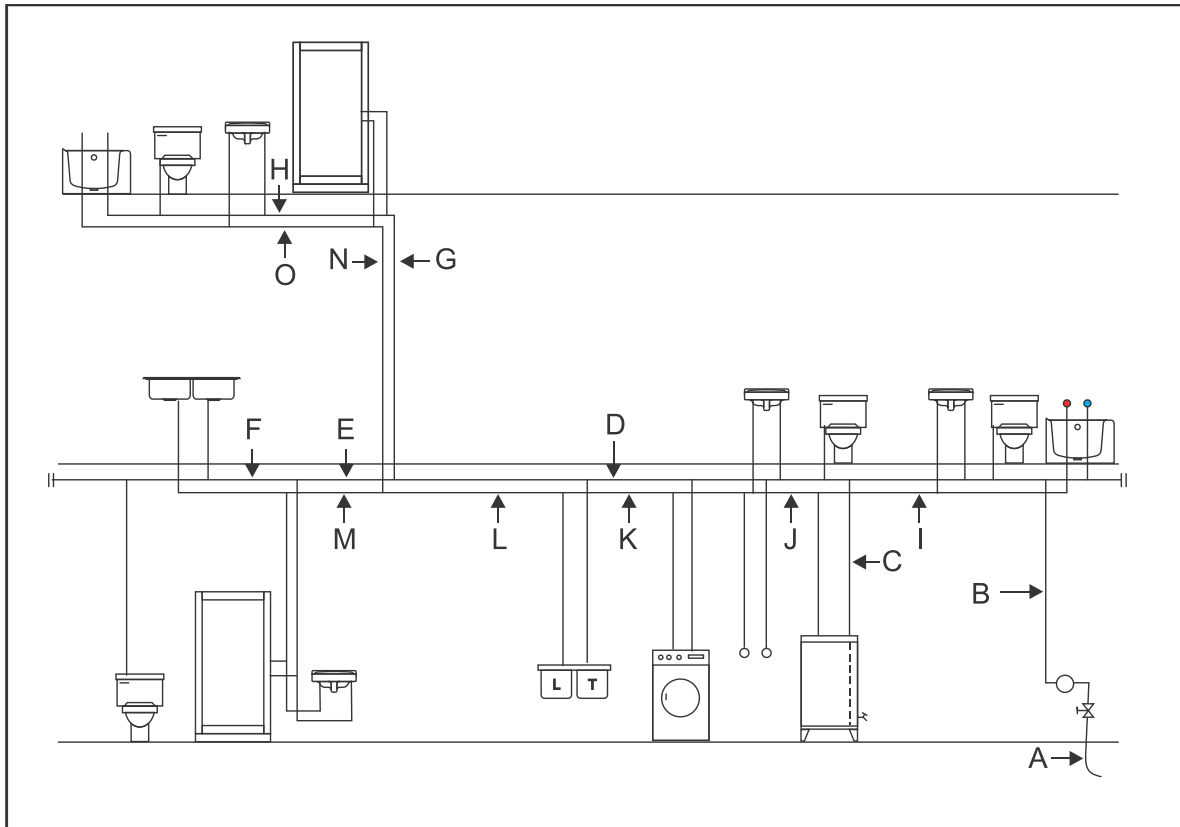


Figure 7

30 meters (100') maximum distance to furthest fixture outlet.
380 kPa (55 psi) water pressure at service connection.
6 meters (20') elevation difference from service to highest fixture outlet.

57. Refer to Figure 7. What is the minimum size water line at letter A?
- A. $\frac{1}{2}$ in.
 - B. $\frac{5}{8}$ in.
 - C. $\frac{3}{4}$ in.
 - D. 1 in.
58. Refer to Figure 7. What is the minimum size water line at letter C?
- A. $\frac{1}{2}$ in.
 - B. $\frac{5}{8}$ in.
 - C. $\frac{3}{4}$ in.
 - D. 1 in.
59. Which joining procedure is only approved for water service piping below ground and outside of the building?
- A. Flaring the pipe.
 - B. Compression fittings.
 - C. Brazing the joint.
 - D. Soldering the joint.
60. What additional equipment is required at the building end of a PE (polyethylene) water service suitable for cold water applications?
- A. Pressure Relief Valve c/w thermal expansion compensator.
 - B. Pressure reducing valve c/w valved bypass.
 - C. Check valve c/w diaphragm tank.
 - D. Testable backflow preventer.

61. When does a spring-loaded inline trap primer deliver a spurt of water to the trap it is serving?
- A. A flush tank for a urinal discharges.
 - B. A flush valve for a urinal or water closet operates.
 - C. The solenoid valve on the supply is opened by a timer.
 - D. The faucet through which it is supplied is opened and closed.
62. A water service enters a building at a geodetic elevation of 724.5 m (2377') with 490 kPa (71 psi) water pressure. What is the water pressure if the water outlet is at an elevation of 729.3 m (2393')?
- A. 235 kPa (34 psi).
 - B. 442 kPa (64 psi).
 - C. 538 kPa (78 psi).
 - D. 745 kPa (108 psi).
63. What piping arrangement would ensure that domestic hot water is readily available to a plumbing fixture?
- A. Mixing valve piped with hot and cold water
 - B. Series piping loop on the water system
 - C. Recirculation line on the water system
 - D. Parallel piping loop on the water system
64. What criteria must be met to insure proper operation of a water meter when installed?
- A. The size of water meter is determined by the water service size.
 - B. The fitting connection on the water meter inlet must be electrically conductive.
 - C. The water meter is installed in a horizontal position.
 - D. The water meter is installed in a vertical position.

65. Which backflow preventer is installed on a boiler using chemical treatment?
- A. Dual check with atmospheric port.
 - B. Double check valve assembly.
 - C. Pressure vacuum breaker.
 - D. Reduced pressure principle backflow preventer.
66. Which device would be required on the water supply connecting to the bottom of a commercial hot water heater?
- A. Check valve located 6" before tank if plastic pipe is used.
 - B. Temperature and pressure relief within the top 150 mm (6 in.) of the tank.
 - C. Vacuum relief valve located at least 6" above the tank.
 - D. Atmospheric vacuum breaker within the top 150 mm (6 in.) of the tank.
67. Which device or method is the most effective for protecting a potable water supply from back siphonage?
- A. Air break.
 - B. Air gap.
 - C. RP device.
 - D. DCVA device.
68. When chemicals are added to a hydronic heating system, which device or method is used to protect the potable water against backflow?
- A. Air gap.
 - B. DCVA.
 - C. RP device.
 - D. PVB device.

69. When installing an Reduced Pressure Principal backflow Preventer (RP), what is required to complete the piping installation?
- A. An air gap fitting on the relief port.
 - B. A direct waste connection to a floor drain.
 - C. A pressure gauge on the upstream side of the device.
 - D. An air gap immediately above a floor drain.
70. A private water well has a standing water level at 30 feet below ground level. Which pump system would best be suited for this installation?
- A. Convertible jet system with two suction pipes.
 - B. Submersible pump with foot valve.
 - C. Gear pump in well with pressure relief valve.
 - D. Deep well jet pump with one suction and one drive pipe.
71. What is required when installing a deep well jet pump?
- A. Check valve is required on the pump discharge.
 - B. Foot valve is required on the jet suction line.
 - C. Relief valve is required with centrifugal jet pumps.
 - D. Modulating valve is required on the pump suction line.
72. A pressure switch is set for 20 psi cut/in and 40 psi cut/out. What is the recommended air pressure on the diaphragm tank for best system performance?
- A. A minimum of 20 psi.
 - B. A maximum of 40 psi.
 - C. 3-5 psi below cut in pressure.
 - D. 3-5 psi below cut out pressure.

73. Which of the following pump voltages will provide more energy efficiency?
- A. 110 line voltage.
 - B. 120 static voltage.
 - C. 220 line voltage.
 - D. 240 static voltage.
74. While watching the pressure gauge as the pump is running, which procedure is used to get the best pumping rate from a two pipe convertible deep well jet system?
- A. Open the pump discharge control valve fully.
 - B. Throttle the pump discharge control valve.
 - C. Adjust the range nut with the pump running.
 - D. Adjust the differential nut with the pump running.

Section 5

FIXTURES, APPLIANCES AND WATER TREATMENT SYSTEMS

75. Which fixture floor support would be installed on a heavy cast iron service sink?
- A. Pressed steel wall bracket.
 - B. Lavatory chair carrier.
 - C. P-trap standard.
 - D. Cast iron floor flange.
76. When setting a wall hung water closet, which installation procedure ensures a water tight seal on the waste connection?
- A. Chair carrier is positioned close to the finished wall.
 - B. Back up nuts and washers are set 1/16" past wall.
 - C. Adjustable nipple is set for compression of gasket.
 - D. Horn wax seal is positioned and compressed by adjustable nipple.
77. Which procedure is used to lengthen the flush time of a typical diaphragm style flushometer valve?
- A. Turn the bypass screw counter clockwise.
 - A. Open the control stop fully.
 - B. Install a new vacuum breaker.
 - C. Turn the flushometer bonnet screw counter clockwise.

78. What must be done prior to connecting the dishwasher waste line to a garbage grinder attached to a kitchen sink?
- A. Increase the continuous waste one pipe size.
 - B. Remove the garbage grinder knock out plug.
 - C. Install a vacuum breaker on the cold water line.
 - D. Install the garbage grinder downstream of the fixture trap.
79. What is the hand held shower piping connected to on a roman tub?
- A. A. Pressure balanced control.
 - B. B. Thermostatic mixing valve.
 - C. C. Diverter valve.
 - D. D. Hot/cold mixing valve.
80. When installing a cultured marble plumbing fixture, what is the manufacturers' recommendation for installation of the patented overflow (PO)?
- A. Use plumber's putty.
 - B. Use silicon on the fixture.
 - C. Apply plumbers grease to threaded parts.
 - D. Apply pipe joint lubricant to threaded parts.
81. What must be considered for a commercial dishwasher when discharging into an interceptor?
- A. The flow rating of the interceptor.
 - B. The discharge rate from the dishwasher.
 - C. Copper drainage piping is installed before the interceptor.
 - D. Copper drainage piping installed within 1.2 meters of the interceptor.

82. What protective plumbing connection must a commercial kitchen combi-oven use?
- A. Atmospheric vacuum breaker on hot and cold water supply.
 - B. Exhaust vent to kitchen canopy with proving switch
 - C. Indirect waste connection to drainage system.
 - D. Air gap connection on waste line
83. What are the requirements for nuts, washers, bolts and screws for attaching a floor flange and water closet to a floor?
- A. Corrosion resistant.
 - B. Zinc coated steel.
 - C. Nickel plated iron.
 - D. Brass plated steel.
84. Which chemical is approved for disinfecting surface water used as a potable supply?
- A. Sodium hypchlorite.
 - B. Potassium chloride.
 - C. Sodium carbonate.
 - D. Potassium permanganate.
85. Which water treatment device is used to remove taste and odour found in water supplies?
- A. Sand filter.
 - B. Water softener.
 - C. Activated carbon filter.
 - D. Iron filter.

86. Which piping arrangement must be used when terminating the regeneration discharge line serving a water softener?
- A. Directly to the bypass valve around softener head.
 - B. Indirectly to approved drainage termination.
 - C. Indirectly to a dual check valve on the softener head.
 - D. Directly to approved drainage termination.
87. Where would the chlorinator be installed when used with a sand filter, water softener and activated carbon filter?
- A. Between the sand filter and the activated carbon filter.
 - B. Between the activated carbon filter and the water softener.
 - C. Before the sand filter, activated carbon filter and softener.
 - D. After the water softener and the activated carbon filter.
88. Which piping connection protects the water treatment equipment water supply from sewage contamination?
- A. Check valve on back wash line.
 - B. Air break termination.
 - C. Stand pipe off floor drain.
 - D. Air gap termination.

Section 6

HYDRONIC HEATING AND COOLING SYSTEMS

89. What piping procedure will assist in the removal of air from a hydronic heating system?
- A. Install air vents at all changes of direction.
 - B. Grade main piping up in the direction of flow.
 - C. Diaphragm tank to have automatic air vent.
 - D. System mains to use concentric fittings.

90. A heating line is installed using steel pipe with the following information:

	<u>Imperial</u>	<u>Metric</u>
COE:	0.0000067	0.0000120
Length:	200'	61 m
Installed @	55°F.	13°C.
Operational @	180°F.	82°C

What is the amount of expansion on this heating line?

	Metric		Imperial
A.	25 mm	A.	1"
B.	50 mm	B.	2"
C.	75 mm	C.	3"
D.	100 mm	D.	4"

91. Which procedure is recommended to control the corrosion with-in a hydronic system?
- A. Chemically maintain an alkaline pH value.
 - B. Add fresh water on a regular basis.
 - C. Chemically maintain a soft water condition.
 - D. Maintain a 50% ethylene glycol solution.

92. What must be installed to protect against air locks in a hydronic system?
- A. Vacuum relief vents at difficult areas to access.
 - B. Manual air vents on condensate returns.
 - C. Air scoop on the return water main.
 - D. Auto air vents at all system high points.
93. What must be considered when positioning a boiler in a mechanical room?
- A. Install it on a fire resistant floor surface if it is cast iron.
 - B. Allow room for access and service.
 - C. Install it next to the hot water tank if connecting to a gasline.
 - D. Install it near the common chimney if it is high efficient.
94. Which hydronic heating boiler control device is used to adjust the boiler water temperature?
- A. Pressure-trol.
 - B. Gas unitrol.
 - C. Aquastat.
 - D. Gas valve.
95. Which device in a water tube boiler will direct the air to an expansion tank connection?
- A. Bourdon tube.
 - B. Tank fitting.
 - C. Centrifugal air scoop.
 - D. Automatic air vent.

96. For the most efficient operation, where is the outside sensor of the indoor/outdoor control installed?
- A. On a west wall with exposure to sun.
 - B. On a north wall just below the soffit.
 - C. In the attic next to the ventilation grill.
 - D. At least 300mm away from an outside light.
97. Where is a flow switch installed on a hydronic heating system?
- A. On the return main where it drops to the boiler.
 - B. Above the safe water line on the boiler.
 - C. Adjacent to the aquastat on the boiler.
 - D. On the injection pump discharge line.
98. What is the correct installation of a thermal bulb (aquastat proportional controller) on a chilled water system?
- A. Install directly into a tapped tee connection.
 - B. Install in a thermal well with conductive paste.
 - C. Strap the bulb on the cooling supply line.
 - D. Mount the bulb on the coolest surface of the chiller.
99. A hydronic heating and cooling convector share the same coil. How many heating/cooling pipes will enter the convector?
- A. One for heating and one for cooling.
 - B. Two for both the heating and cooling.
 - C. One for heating and two for cooling.
 - D. Two for heating and one for cooling.

100. When installing baseboard/wall fin enclosure, where should the heating element be placed?
- A. Immediately after the zone control valve.
 - B. Split it up equally along the wall.
 - C. Close as possible to the highest heat loss.
 - D. Where there is no damper control.
101. A piece of baseboard heating element produces 350 BTU's /hr/ft at 180°F. How many feet of element would be installed to handle a heat loss of 4900 BTU's on a 30 foot long wall?
- A. 12' (3.6 m)
 - B. 14' (4.3 m)
 - C. 27' (8.2 m)
 - D. 30' (9.1 m)
102. What is used to control the amount of heat leaving a baseboard enclosure?
- A. Installation height.
 - B. Perforated enclosure.
 - C. Pivoting damper.
 - D. Reflective backing.
103. Where would a floor mounted hydronic cooling convactor be located in a room?
- A. On the wall with the lowest heat gain.
 - B. On the wall with the highest heat gain.
 - C. Near the occupied area of the room.
 - D. On the floor with the highest heat loss

Section 7

SPECIALIZED SYSTEMS

104. Which joining procedure is used for plastic pipe on a natural gas service?
- A. Brazing.
 - B. Threading.
 - C. Thermal fusion.
 - D. Solvent welding.
105. What is the minimum ground cover for underground gas piping?
- A. 600 mm (24")
 - B. 450 mm (18")
 - C. 400 mm (16")
 - D. 300 mm (12")
106. Which color coding is used for medical air gas labeling?
- A. Green and white.
 - B. Black and white.
 - C. Blue and silver.
 - D. Yellow and silver.
107. Which identification systems are used to prevent improper connections for medical gas outlets?
- A. Diameter-Index Safety System and Pin-Index Safety System.
 - B. Diameter-Index Safety System and Pin-Insert Safety System.
 - C. Double-Insert Safety System and Pin-Index Safety System.
 - D. Diameter-Index Safety System and Thread-Index Safety System.

108. What is the minimum space required around the handle of a fire hose cabinet valve for proper operation?
- A. 1"
 - B. 2"
 - C. 3"
 - D. 4"
109. Which term is used to describe a complete recirculation of swimming pool water?
- A. Rate of exchange.
 - B. Rate of transfer.
 - C. Rate of turnover.
 - D. Rate of circulation.
110. What must be known to size a lawn irrigation system for proper sprinkler coverage?
- A. Size of water service piping, size of water meter and static water pressure.
 - B. Size of water distribution piping, size of water meter and dynamic water pressure.
 - C. Size of water distribution piping, size of water meter and static water pressure.
 - D. Size of water service piping, size of water meter and dynamic water pressure.
111. How is the branch piping on a pneumatic system installed?
- A. Graded toward the compressor.
 - B. Level from the main to the outlet.
 - C. Graded from the main to the outlet.
 - D. Level from the main to the first drop.

112. Which piping material would be used in a dairy for conveying milk products?
- A. Copper bearing steel.
 - B. Grey cast iron.
 - C. Galvanized iron.
 - D. Stainless Steel.
113. Which type of piping connections would be used in process piping systems where frequent replacement of pipe sections is required?
- A. Welded.
 - B. Flared.
 - C. Flanged.
 - D. Threaded.

Section 8

MAINTENANCE AND REPAIRS

114. What regular maintenance is required on a testable backflow preventer to insure safe operation?
- A. Journeyman plumber tests the device annually.
 - B. Service man tests the device every second year.
 - C. Certified specialist tests the device annually.
 - D. Property owner tests the device every other year.
115. A water pressure system pump cycles on and off very quickly when water is being used in the building. Which condition is the most probable cause?
- A. Pressure switch differential is too high.
 - B. Pump pressure switch contacts are dirty.
 - C. Diaphragm tank is water logged.
 - D. Water supply to the pump is inadequate.
116. What is the corrective action necessary to repair a diaphragm type flush valve serving a commercial WC that runs continuously?
- A. Turn down the control stop.
 - B. Replace the vacuum breaker.
 - C. Clean out the diaphragm orifice.
 - D. Reseat the dislodged diaphragm.
117. Which maintenance procedure is recommended on a residential, gas fired storage type water heater to prevent poor heat transfer by conduction from the heat source?
- A. Insulate the water heater.
 - B. Drain and flush the tank occasionally.
 - C. Turn down the water heater temperature.
 - D. Open the T and P relief valve occasionally.

118. Which maintenance procedure is recommended on an instantaneous water heater when the domestic supply is hard water?
- A. Adjust the flow restricting device.
 - B. Reverse in and out lines occasionally.
 - C. Occasionally run it through a water softener.
 - D. Isolate and flush the unit with a vinegar solution.
119. What will happen to the private sewage disposal system if the septic tank is not maintained and emptied on a regular basis?
- A. Anaerobic bacteria will cease to function.
 - B. Solids will carry over and damage the field.
 - C. Amount of effluent flushed will increase.
 - D. Gases in the tank will enter the venting system.
120. A water closet bowl has a slow and lazy flush, but is receiving enough water and the drain and vent are clear. What could be done to correct the problem?
- A. Install a larger water line.
 - B. Open the supply valve fully.
 - C. Clean out the under rim drillings.
 - D. Change the flush ball or flapper.
121. Occasionally a water closet will sound as if water is filling the tank when not in use, but the tank is not overflowing. Which procedure is used to correct this problem?
- A. Partially close the water supply stop.
 - B. Adjust the trip lever handle.
 - C. Replace the tank ball or flapper.
 - D. Adjust the ball cock assembly.

122. Which procedure will correct the occasional discharge from a reduced pressure principle backflow preventer when the water pressure fluctuates?
- A. Install a swing check valve upstream of the RP.
 - B. Install a swing check valve downstream of the RP.
 - C. Restrict the water flow to the RP by using a globe valve.
 - D. Put in a stronger check valve spring upstream of the RP.
123. What is installed to correct water hammer caused by quickly closing a faucet?
- A. 1/2" by 18" air chambers.
 - B. Regulating quick opening valves.
 - C. Manufactured arrestors.
 - D. A home run system.
124. An inspection of a hot water heating system shows that the system pressure is in excess of the designed operating pressure. Which device will cause this problem?
- A. Circulator.
 - B. Water-feed valve.
 - C. Outdoor compensator.
 - D. Pressure relief valve.
125. A customer complains that their gas fired hot water heater no longer produces an adequate amount of hot water. What component of the hot water heater should be replaced?
- A. Dip tube.
 - B. Anode rod.
 - C. Mixing valve.
 - D. Thermocouple.