Board Exam Desk

Master Plumbing Reviewer

Master Plumbing Licensure Examination | PRC | 120 original questions

2026 Edition | Updated November 2026

Original board-style practice questions with an answer key.

Practice questions

Plumbing Arithmetic

1. Water flows at 1.5 m/s through a pipe with a 50 mm inside diameter. What is the discharge in liters per second?

A. 3.75 L/s
B. 0.74 L/s
C. 2.95 L/s
D. 11.78 L/s

2. A vertical riser is completely filled with water to a height of 18 m above a gauge at its base. Neglecting flow, what does the gauge read?

A. 1766 kPa
B. 17.7 kPa
C. 176.6 kPa
D. 277.9 kPa

3. A pressure gauge on a water main reads 250 kPa. What is the equivalent pressure head in meters of water?

A. 35.81 m
B. 24.20 m
C. 25.48 m
D. 2.55 m

4. A rectangular concrete cistern has inside dimensions of 2.0 m by 1.5 m and holds water to a depth of 1.2 m. How many liters does it contain?

A. 360 L
B. 36,000 L
C. 4,700 L
D. 3,600 L

5. A cylindrical elevated tank has an inside diameter of 1.2 m and a water depth of 1.5 m. What volume of water does it hold?

A. 1,696 L
B. 6,786 L
C. 2,160 L
D. 1,414 L

6. A 3.0 m3 storage tank is filled by a line delivering a steady 0.5 L/s. How long does it take to fill the empty tank?

A. 150 minutes
B. 100 minutes
C. 60 minutes
D. 10 minutes

7. A horizontal building drain 15 m long is laid at a uniform slope of 2 percent. What is the total fall from end to end?

A. 200 mm
B. 300 mm
C. 150 mm
D. 30 mm

8. A horizontal drain run of 6 m drops 120 mm from its upper end to its lower end. What is its slope?

A. 2 percent
B. 1 percent
C. 0.2 percent
D. 5 percent

9. Water moves at 1.2 m/s in a 75 mm pipe that reduces to a 50 mm pipe. Assuming full flow, what is the velocity in the smaller pipe?

A. 0.53 m/s
B. 4.05 m/s
C. 2.70 m/s
D. 1.80 m/s

10. A pump must deliver 10 L/s against a total dynamic head of 30 m. If the pump efficiency is 70 percent, what brake power is required?

A. 2.94 kW
B. 4.20 kW
C. 42.0 kW
D. 2.06 kW

11. What is the water (hydraulic) power imparted to a flow of 5 L/s raised through a total head of 40 m?

A. 2.63 kW
B. 0.20 kW
C. 19.6 kW
D. 1.96 kW

12. A walk-up apartment has 12 units with an average of 5 occupants each. Using a design consumption of 200 L per person per day, what is the daily water demand?

A. 60,000 L
B. 2,400 L
C. 1,000 L
D. 12,000 L

13. A septic tank compartment measures 2.4 m long and 1.2 m wide inside, with a liquid depth of 1.5 m. What is its liquid capacity?

A. 3.60 m3
B. 5.10 m3
C. 4.32 m3
D. 2.88 m3

14. About how many liters of water are needed to fill 100 m of supply pipe with a 25 mm inside diameter?

A. 49.1 L
B. 62.5 L
C. 196.3 L
D. 4.91 L

15. A storage water heater thermostat is marked 140 degrees Fahrenheit. What is this setting in degrees Celsius?

A. 77.8 degrees C
B. 60 degrees C
C. 50 degrees C
D. 45.6 degrees C

16. A booster pump nameplate lists a shutoff pressure of 60 psi. What is this in kilopascals?

A. 413.7 kPa
B. 588.6 kPa
C. 41.4 kPa
D. 870.2 kPa

17. An imported pressure tank is rated at 500 US gallons. What is its capacity in liters?

A. 2,273 L
B. 1,640 L
C. 132 L
D. 1,893 L

18. Using the Darcy-Weisbach equation, find the friction head loss in 200 m of 100 mm pipe carrying water at 1.5 m/s with a friction factor of 0.02.

A. 9.17 m
B. 4.59 m
C. 3.06 m
D. 0.46 m

19. Street main pressure is 350 kPa. A fixture sits 12 m above the main and the pipe friction loss to it is 60 kPa. What residual pressure is available at the fixture?

A. 292.3 kPa
B. 232.3 kPa
C. 278.0 kPa
D. 172.3 kPa

20. Neglecting losses, with what theoretical velocity does water leave a small opening at the bottom of a tank where the water surface is 3 m above the opening?

A. 58.86 m/s
B. 5.42 m/s
C. 3.84 m/s
D. 7.67 m/s

21. A flat roof with a plan area of 400 m2 is designed for a rainfall intensity of 100 mm/h. Assuming full runoff, what peak flow must the roof drains carry?

A. 40.0 L/s
B. 1.11 L/s
C. 667 L/s
D. 11.1 L/s

22. A 30 m straight run of plastic hot water pipe has a linear expansion coefficient of 0.00005 per degree C. How much does it lengthen when heated by 40 degrees C?

A. 1.5 mm
B. 6 mm
C. 60 mm
D. 120 mm

23. An elevated water tank holds 2.5 m3 of water. What weight of water, in kilonewtons, must the supporting slab carry?

A. 245 kN
B. 2.5 kN
C. 254.8 kN
D. 24.5 kN

24. A pipe offset is made with two 45-degree elbows. If the offset (perpendicular distance between the parallel runs) is 600 mm, what is the travel measured center to center?

A. 424.3 mm
B. 848.5 mm
C. 1039.2 mm
D. 1200 mm

25. An empty 4 m3 rooftop tank must be filled in 2 hours. What minimum steady supply rate is required?

A. 1.11 L/s
B. 0.556 L/s
C. 0.056 L/s
D. 33.3 L/s

26. A supply line must carry 3 L/s with velocity not exceeding 2.0 m/s. What is the smallest of these nominal inside diameters that satisfies the limit?

A. 50 mm
B. 32 mm
C. 40 mm
D. 65 mm

27. A basement booster pump discharges at 500 kPa. Ignoring friction, what static pressure remains at a fixture 30 m above the pump?

A. 470 kPa
B. 794.3 kPa
C. 294.3 kPa
D. 205.7 kPa

28. A sewer line is specified with a slope of 1 in 40. What is the equivalent slope in percent?

A. 1.4 percent
B. 2.5 percent
C. 4.0 percent
D. 0.25 percent

29. A storage tank holds diesel fuel with a specific gravity of 0.85 to a depth of 10 m. What gauge pressure acts on the tank floor?

A. 8.5 kPa
B. 115.4 kPa
C. 83.4 kPa
D. 98.1 kPa

30. For a design exercise, a water closet is assigned 4 drainage fixture units, a lavatory 1, and a shower 2. What is the total load of 3 water closets, 4 lavatories and 2 showers?

A. 20 DFU
B. 9 DFU
C. 24 DFU
D. 16 DFU

Sanitation, Plumbing Design and Installation

31. What is the basic function of a fixture trap in a sanitary drainage system?

A. It stores waste water until the stack can receive it
B. It filters grease and lint before they reach the drain
C. It holds a water seal that blocks sewer gas from entering
D. It slows waste flow so solids settle out in the fixture

32. Why is a vent system connected to the sanitary drainage piping of a building?

A. To equalize air pressure so trap seals are not lost
B. To let excess water in the drains overflow safely
C. To give a backup outlet if the building sewer clogs
D. To carry rainwater away from roofs and balconies

33. A lavatory has a long, steep trap arm with no vent near the trap. After each full basin drains, the trap is found nearly empty. What is this condition called?

A. Back pressure on the trap
B. Capillary loss of the seal
C. Evaporation of the seal
D. Self-siphonage of the trap

34. Which process mainly reduces the organic solids retained in a conventional septic tank?

A. Anaerobic bacterial digestion
B. Ultraviolet disinfection
C. Chemical coagulation by alum
D. Aerobic oxidation at the surface

35. A commercial restaurant kitchen discharges large amounts of fats and oils. What device should be installed on its waste line?

A. A backwater valve at the fixture outlet
B. A sand interceptor at the building sewer
C. A vacuum breaker on the kitchen sink faucet
D. A grease interceptor before the sewer connection

36. A loud bang is heard in the supply piping whenever a quick-closing valve shuts. What is the most direct remedy?

A. Raise the setting of the water heater
B. Add a cleanout at the base of the stack
C. Increase the size of the building drain
D. Install a water hammer arrester near the valve

37. Why is an unprotected cross-connection considered one of the most serious plumbing hazards?

A. It can let contaminated water enter the potable supply
B. It reduces the hot water heater's efficiency
C. It causes pipe joints to loosen over time
D. It raises the water bill through hidden leaks

38. Which backflow prevention method is generally regarded as the most reliable because it has no moving parts?

A. A double check valve assembly
B. An air gap between outlet and flood rim
C. An atmospheric vacuum breaker
D. A spring-loaded swing check valve

39. In water reuse planning, which wastewater is classified as graywater?

A. Discharge from showers, lavatories and laundry
B. Effluent leaving a septic tank leaching field
C. Discharge from water closets and urinals
D. Runoff collected from roofs and paved areas

40. What distinguishes the building drain from the building sewer?

A. The drain is within the building; the sewer runs outside to disposal
B. The drain carries storm water; the sewer carries sanitary waste
C. The drain is vertical piping; the sewer is horizontal piping
D. The drain serves fixtures upstairs; the sewer serves ground level

41. A designer is choosing locations for drainage cleanouts. Which location is most important?

A. Next to every hot and cold water shutoff
B. At changes of direction and at the base of stacks
C. Directly under each fixture supply stop
D. At the highest point of each vent terminal

42. What is the purpose of the temperature and pressure relief valve on a storage water heater?

A. To drain sediment from the tank bottom automatically
B. To prevent cold water from mixing with hot water
C. To keep the outlet temperature constant at all times
D. To release water if temperature or pressure gets unsafe

43. In a downfeed water distribution system, what supplies the pressure at the fixtures?

A. Gravity from an elevated or rooftop tank
B. Direct pressure from the street main only
C. Compressed air in a basement hydropneumatic tank
D. A pump running continuously at all fixtures

44. What role does the air cushion in a hydropneumatic tank play?

A. It heats the water before distribution
B. It removes dissolved iron from the water
C. It maintains pressure and limits pump starts
D. It filters sediment from incoming water

45. Which piping material is unsuitable for hot water distribution lines?

A. CPVC hot and cold pipe
B. PPR heat-fusion pipe
C. Type L copper tube
D. Ordinary uPVC pressure pipe

46. A copper water line is joined directly to a galvanized steel pipe. Rapid corrosion appears at the joint. What fitting should have been used?

A. A long-sweep elbow
B. A flexible rubber hose
C. A brass reducing bushing
D. A dielectric union

47. Hard water causes scale in kettles and water heaters. Which dissolved ions are chiefly responsible?

A. Chloride and sulfate
B. Iron and manganese
C. Sodium and potassium
D. Calcium and magnesium

48. Before a newly installed potable water system is placed in service, what treatment is normally carried out?

A. Pressurizing the pipes with steam
B. Filling the pipes with seawater for a day
C. Flushing and disinfection with chlorine
D. Coating the pipes inside with grease

49. A site is being evaluated for a septic tank with a subsurface absorption field. Which test indicates whether the soil can accept the effluent?

A. A percolation test
B. A ball test
C. A smoke test
D. A slump test

50. What does the drainage fixture unit (DFU) value of a fixture represent?

A. The number of people a fixture can serve each day
B. A relative load factor based on probable use and discharge
C. The pipe diameter in inches needed by the fixture
D. The exact discharge of the fixture in liters per second

51. In a bathroom group, a section of pipe serves as the vent for one fixture while also receiving the discharge of another. What is this pipe called?

A. A dry vent
B. A wet vent
C. A loop vent
D. A yoke vent

52. A basement toilet room lies below the level of the public sewer. How is its waste normally disposed of?

A. It drains to a sump and is pumped up to the sewer
B. It drains by gravity through a larger pipe
C. It is vented through the roof to the sewer
D. It is connected to the storm drain instead

53. Ground-floor fixtures in a low-lying building flood with sewage when the street sewer surcharges. What device protects them?

A. A vacuum breaker on each faucet
B. A pressure reducing valve on the supply
C. A backwater valve on the drain serving them
D. An expansion tank on the water heater

54. In a closed hot water system with a check valve at the meter, why is an expansion tank installed?

A. To lower the temperature of outgoing water
B. To trap sediment before it enters the heater
C. To store extra hot water for peak demand
D. To absorb the volume increase as water is heated

55. Why are horizontal drains laid with a minimum slope rather than level?

A. To prevent air from entering the drainage system
B. To make the pipes easier to support on hangers
C. To keep the pipe running completely full of water
D. To keep velocity high enough to carry solids along

56. Why are sanitary drains designed to flow only partly full under normal conditions?

A. So that waste moves slower and settles in the pipe
B. So an air space remains to keep pressures balanced
C. So that smaller pipe sizes can always be used
D. So that the pipe walls are never wetted by waste

57. Street pressure feeding a low-rise residence is high enough to make faucets splash and fittings leak. What device is commonly installed?

A. A float valve in each fixture supply
B. A larger water meter at the property line
C. A pressure reducing valve after the meter
D. A booster pump at the service entrance

58. Why is a vacuum breaker fitted to a hose bibb near a garden?

A. To stop back-siphonage through an attached hose
B. To filter sand from the garden hose water
C. To prevent the hose from bursting in sunlight
D. To raise water pressure at the hose nozzle

59. What is the main purpose of a relief vent in a tall drainage stack?

A. To carry kitchen waste around grease interceptors
B. To serve as a cleanout for the building sewer
C. To provide extra air circulation between drain and vent
D. To drain the water heater relief valve discharge

60. A soil stack is defined by the type of waste it carries. Which discharge makes a stack a soil stack rather than a waste stack?

A. Discharge from lavatories and bathtubs only
B. Discharge from roof drains and downspouts
C. Discharge from water closets or similar fixtures
D. Discharge from kitchen sinks and dishwashers

National Plumbing Code and Plumbing Law

61. Which Republic Act is known as the Plumbing Law of the Philippines and regulates the practice of master plumbing?

A. Republic Act No. 9266
B. Republic Act No. 1378
C. Republic Act No. 7920
D. Republic Act No. 544

62. Which government body administers the licensure examination and registration of master plumbers in the Philippines?

A. The Local Water Utilities Administration
B. The Department of Public Works and Highways
C. The Professional Regulation Commission
D. The Department of Health

63. A contractor proposes installing two traps in series on one kitchen sink to give extra odor protection. How does the code treat this?

A. It is allowed if both traps are vented
B. It is required for all commercial sinks
C. It is allowed only on horizontal drains
D. Double trapping a fixture is prohibited

64. Which type of trap is prohibited by plumbing codes?

A. An integral trap cast into a water closet bowl
B. A tubular trap of the same size as the outlet
C. A P-trap with a cleanout plug at the bottom
D. A trap that relies on moving parts for its seal

65. What does the code generally require regarding the size of drainage piping in the direction of flow?

A. It must not be reduced in size downstream
B. It must be smaller than the fixture outlet
C. It must be reduced at every branch fitting
D. It must alternate sizes for better venting

66. A walk-in refrigerator drain must be connected to the plumbing system. How should it discharge?

A. Indirectly, through an air gap or air break
B. Directly into the nearest water closet bowl
C. Into the potable water return line
D. Directly to the building drain with a trap

67. Where must the open end of a vent stack serving a building terminate?

A. Outdoors, open to the atmosphere above the roof
B. Inside the toilet room behind the WC
C. Into the nearest rainwater leader
D. Inside the attic or ceiling space

68. How should horizontal dry vent piping be graded?

A. So any moisture drains back by gravity to the drainage pipe
B. Level, with sags allowed at each hanger
C. Downward to a dead end with no outlet
D. Upward away from the stack with a water trap

69. A cleanout plug is located behind a wall finish that must be broken to reach it. Why does this violate code intent?

A. Cleanouts must be painted to match the wall
B. Cleanouts must remain readily accessible
C. Cleanouts must face the ceiling at all times
D. Cleanouts must be larger than the drain served

70. Under plumbing code definitions, what is backflow?

A. Flow of water through a relief valve to a drain
B. Flow from a vent pipe into a rainwater leader
C. Flow into the potable supply from any other source
D. Flow of sewage down a stack faster than design

71. What is the stack vent of a building?

A. A vent that serves only floor drains in a basement
B. A horizontal vent connecting two separate fixtures
C. The extension of a soil or waste stack above the highest drain
D. A vertical vent that starts at the building sewer

72. How is the developed length of a pipe measured?

A. Along the vertical portions of the run only
B. Along the shortest straight line between ends
C. Along the centerline of the pipe and fittings
D. Along the outside wall of the pipe only

73. For plumbing code purposes, a pipe is classed as horizontal when it is installed at what angle?

A. More than 45 degrees from the horizontal
B. Less than 60 degrees from the vertical
C. Exactly 0 degrees from the horizontal
D. Less than 45 degrees from the horizontal

74. When rough-in drainage, waste and vent piping is installed, when must it be tested and inspected?

A. Only when the owner requests a test
B. Before it is covered or concealed
C. After the fixtures have been used for a month
D. After the walls are plastered and painted

75. At a lavatory faucet, on which side should the hot water control be located as the user faces the fixture?

A. On the right side
B. Directly underneath
C. At the back center
D. On the left side

76. When a water pipe passes through a concrete wall or slab, what is normally provided?

A. A reducer that narrows the pipe at the wall
B. A sleeve that protects the pipe and allows movement
C. A rigid grout bond fixing the pipe to the concrete
D. A union placed inside the thickness of the wall

77. After cutting a length of pipe, what must be done to the cut end before joining?

A. Ream it to remove burrs and restore full bore
B. Leave the burr to grip the fitting
C. Paint it with lead-based primer
D. Flatten it slightly for a tighter fit

78. Which drainage fitting feature is prohibited because it obstructs flow?

A. A cleanout with a threaded brass plug
B. A wye branch entering at 45 degrees
C. A smooth long-radius interior bend
D. An inner ledge, shoulder or reduction

79. A horizontal branch drain must change to another horizontal direction. Which fitting is appropriate?

A. A standard sanitary tee
B. A straight cross fitting
C. A wye or long-sweep fitting
D. A double sanitary tee

80. A restaurant's toilets are being connected. Should their discharge be routed through the grease interceptor?

A. No, toilets must discharge to the storm drain instead
B. Yes, if the interceptor is larger than the septic tank
C. No, toilet waste must bypass the grease interceptor
D. Yes, all kitchen and toilet waste must pass through it

81. A homeowner wants to connect roof downspouts to the septic tank to reduce yard flooding. Why is this unacceptable?

A. Roof water is classified as potable water
B. Storm water would overload and flush out the tank
C. Downspouts must be connected to the vent stack
D. Rainwater makes septic bacteria too active

82. May a plumbing vent pipe also be used as a rainwater leader?

A. Yes, if the vent is at least 100 mm
B. No, unless a trap is placed at the roof
C. Yes, during the rainy season only
D. No, vents may not receive storm water

83. Where should the discharge pipe of a water heater relief valve terminate?

A. Reduced in size to the nearest supply pipe
B. Into a capped end inside the wall cavity
C. Into a trap with no air gap to the sewer
D. Full size to a safe, visible point of disposal

84. An auto repair shop's floor drains collect oil, grit and sand. What should be installed before they join the sewer?

A. A sand and oil interceptor
B. A grease trap for kitchens
C. A lint trap for laundries
D. A hair interceptor

85. Why must a fixture trap be placed as close as practicable to the fixture outlet?

A. To make the vent pipe longer and more effective
B. To limit the fouling surface and keep the seal effective
C. To allow the trap to double as a cleanout
D. To let the fixture drain by vacuum instead

86. What is a dead end in a drainage or vent system?

A. A vent that terminates properly above the roof
B. A trap arm that connects a fixture to a stack
C. A capped branch extension with no connection or outlet
D. The final manhole at the public sewer connection

87. How does the code generally treat direct connections between a potable water system and a nonpotable source?

A. They are allowed when the pressure is high
B. They are prohibited unless protected against backflow
C. They are allowed if the pipes are color coded
D. They are allowed in single-family dwellings

88. Under the plumbing law, who may take responsibility for the installation of plumbing in a building?

A. A duly registered and licensed master plumber
B. Any building owner with a barangay clearance
C. Any plumber's helper with five years' experience
D. Any supplier of pipes and plumbing fixtures

89. In plumbing terminology, what is a trap arm?

A. The vertical pipe above the highest drain branch
B. The pipe between the fixture and the trap inlet
C. The overflow passage inside a water closet tank
D. The pipe between the trap outlet and the vent connection

90. What does the term potable water mean in plumbing codes?

A. Water recycled from lavatory drains
B. Water used only for fire protection
C. Water safe for drinking and domestic use
D. Water stored in a rooftop tank only

Practical Problems and Experiences

91. A lavatory gurgles and its trap partly empties each time a nearby water closet on the same branch is flushed. What is the most likely cause?

A. Too much pressure in the cold water line
B. A worn faucet washer in the lavatory
C. A loose flange bolt at the water closet
D. Inadequate venting causing induced siphonage

92. A seldom-used floor drain in a storage room gives off sewer odor. What is the likely cause and simple fix?

A. The cleanout is too large; replace with a smaller one
B. The vent is oversized; reduce the vent pipe
C. The trap seal evaporated; refill it or add a trap primer
D. The drain is too steep; reset it at less slope

93. A water closet tank keeps running and water spills into the overflow tube. What adjustment usually fixes this?

A. Lower the float so the fill valve shuts off earlier
B. Open the angle stop valve all the way
C. Raise the float to admit more water
D. Replace the closet bolts at the floor

94. In a building fed by a rooftop tank, fixtures on the top floor have weak flow while lower floors are fine. What is the usual remedy?

A. Lower the overhead tank closer to the roof slab
B. Enlarge the building sewer serving the floors
C. Install a booster pump for the upper floors
D. Install a pressure reducing valve on top floor

95. A washing machine's solenoid valve shuts suddenly and the pipes knock each time. What should the plumber install?

A. Water hammer arresters at the machine supply valves
B. A larger trap on the laundry standpipe
C. A vacuum breaker on the dryer vent
D. A check valve on the building drain

96. Every ground-floor fixture drains slowly while the upper floors drain normally. Where should the plumber look first?

A. The supply valve under each lavatory
B. The building drain or sewer, through the main cleanout
C. The vent terminal on the roof of the building
D. The hot water heater on the second floor

97. When soldering a copper water line, what preparation is essential for a sound joint?

A. Paint the joint before heating it
B. Clean the tube and fitting, then apply flux
C. Wrap the tube with thread seal tape first
D. Wet the joint with water before heating

98. What is the correct sequence for a solvent-cemented PVC joint?

A. Clean and prime, apply cement, insert with a quarter turn
B. Insert the pipe dry, then brush cement on the outside
C. Heat the fitting, insert the pipe, then apply cement
D. Apply cement, wait until dry, then insert the pipe

99. How are PPR (polypropylene random) pipes and fittings normally joined?

A. By lead and oakum caulking
B. By heat fusion of pipe and socket
C. By solvent cement and primer
D. By threading and pipe dope

100. When making up threaded galvanized steel pipe joints for a water line, what is applied to the male threads?

A. Solvent cement for PVC pipe
B. Soldering flux and lead-free solder
C. Silicone grease meant for O-rings
D. Thread seal tape or pipe joint compound

101. A plumber must loosen the nuts holding a faucet to the underside of a sink, deep behind the basin. Which tool is designed for this?

A. A spud wrench
B. A basin wrench
C. A strap wrench
D. A chain wrench

102. A water closet is stopped up and plunging has failed. Which tool is designed to clear the bowl without scratching it?

A. A pipe reamer
B. A closet auger
C. A tubing cutter
D. A flaring tool

103. The leaching field of a house's septic system has wet, smelly patches on the ground surface. What is the most likely cause?

A. The tank is overdue for desludging or the soil is clogged
B. The vent stack of the house is too tall
C. The water heater thermostat is set too high
D. The cold water supply pressure is too low

104. Cold water pipes in an air-conditioned ceiling drip water onto the ceiling boards, yet no joints leak. What is the fix?

A. Install a check valve on the cold line
B. Raise the water pressure in the cold line
C. Insulate the cold pipes to stop condensation
D. Replace the pipes with a larger diameter

105. A homeowner suspects a hidden leak in a concealed supply line. What is a simple first check?

A. Close all fixtures and watch whether the meter moves
B. Open every faucet fully and listen to the pipes
C. Shut the main valve and turn on the water heater
D. Pour dye into the toilet bowl and wait

106. An old house served by galvanized steel pipes gets reddish-brown water after it sits overnight. What is the likely cause?

A. A partly closed main gate valve
B. Internal corrosion of the steel pipes
C. Excessive chlorine in the city water
D. A failed thermostat in the heater

107. Water stops flowing from a gravity-fed line after the system was drained and refilled, though the tank is full. What is the likely problem?

A. Back pressure in the drainage stack
B. An air lock at a high point in the piping
C. A missing cleanout plug in the drain
D. Too much slope on the building drain

108. A water closet tank takes several minutes to refill, though other fixtures have good pressure. What should be checked first?

A. The angle valve and fill valve for partial closure or debris
B. The vent stack on the roof for a bird's nest
C. The wax ring under the bowl for a broken seal
D. The flush handle chain for excess length

109. A compression faucet continues to drip after it is fully closed. What is the usual repair?

A. Tighten the supply pipe hanger
B. Replace the trap below the lavatory
C. Install a larger aerator on the spout
D. Replace the worn washer or reface the seat

110. A booster pump connected to a pressure tank starts and stops every few seconds when one faucet is open. What is the most likely cause?

A. The faucet aerator is the wrong size
B. The tank has lost its air charge and is waterlogged
C. The building drain is not vented
D. The suction line is larger than the discharge

111. A plumber is roughing in a water closet in a new bathroom. What must be measured to match the bowl selected?

A. The distance from the ceiling to the center of the outlet
B. The height of the vent terminal above the roof
C. The distance from the finished wall to the center of the outlet
D. The length of the building sewer to the street

112. When laying a building sewer in a trench, how should the pipe be supported?

A. Directly on soft mud at the trench bottom
B. On firm, uniform bedding free of rocks
C. On wooden blocks left in place permanently
D. On scattered stones placed at the joints

113. Before cutting into an existing pressurized water line to add a branch, what should be done first?

A. Increase the pressure to test the old pipe
B. Cut quickly and cap the pipe with a hand
C. Turn on the water heater to warm the pipe
D. Shut off the controlling valve and drain the line

114. A water heater relief valve drips a little each time the heater runs, in a home with a check valve at the meter. What is the appropriate correction?

A. Raise the thermostat setting higher
B. Plug the relief valve discharge pipe
C. Install a properly sized thermal expansion tank
D. Remove the cold water shutoff valve

115. A plumber fills an existing drainage system with dense, harmless smoke under slight pressure. What is the purpose of this test?

A. To disinfect the potable water distribution system
B. To measure the water pressure at each fixture
C. To find leaks and defects in the drain and vent piping
D. To check whether the water heater is efficient

116. A slip-joint P-trap under a lavatory drips at one of its nuts. What is the usual remedy?

A. Fill the joint with solvent cement for PVC
B. Wrap the nut with electrical tape tightly
C. Realign and tighten the nut, replacing the washer if worn
D. Remove the trap and connect the pipe straight

117. A household kitchen sink drains slowly and the clog recurs every few months. What advice best prevents recurrence?

A. Avoid pouring cooking grease down the sink
B. Remove the trap so water drains faster
C. Run only hot water through the cold line
D. Close the vent pipe to keep odors out

118. After repairs on a street water main, several faucets in a house have very low flow, though pressure at the hose bibb is normal. What is the likely cause?

A. Debris lodged in the faucet aerators
B. A broken vent pipe on the roof
C. A failed septic tank baffle
D. An undersized building drain

119. A customer reports hot water coming from cold taps across the house. Which component is a likely cause?

A. An undersized cleanout at the stack base
B. A clogged trap under the kitchen sink
C. A faulty mixing valve letting hot cross into cold
D. A cracked vent pipe in the attic space

120. A plumber must cut a 20 mm copper tube squarely without deforming it. Which tool is best suited?

A. A pipe wrench
B. A tubing cutter
C. A cold chisel
D. A hacksaw with a coarse blade

Answer key

Master Plumbing

1. C. 2.95 L/s

A = (pi/4)(0.05)^2 = 0.001963 m2; Q = A x v = 0.001963 x 1.5 = 0.00295 m3/s = 2.95 L/s.

2. C. 176.6 kPa

Static pressure = gamma x h = 9.81 kN/m3 x 18 m = 176.6 kPa.

3. C. 25.48 m

h = p / gamma = 250 / 9.81 = 25.48 m of water.

4. D. 3,600 L

V = 2.0 x 1.5 x 1.2 = 3.6 m3, and 1 m3 = 1,000 L, so 3,600 L.

5. A. 1,696 L

V = (pi/4)(1.2)^2(1.5) = 1.696 m3 = about 1,696 L.

6. B. 100 minutes

3.0 m3 = 3,000 L; time = 3,000 / 0.5 = 6,000 s = 100 minutes.

7. B. 300 mm

Fall = 0.02 x 15 m = 0.30 m = 300 mm.

8. A. 2 percent

Slope = 0.120 m / 6 m = 0.02 = 2 percent.

9. C. 2.70 m/s

By continuity v2 = v1(D1/D2)^2 = 1.2 x (75/50)^2 = 2.70 m/s.

10. B. 4.20 kW

Water power = 9.81 x 0.010 x 30 = 2.943 kW; brake power = 2.943 / 0.70 = 4.20 kW.

11. D. 1.96 kW

P = gamma Q H = 9.81 x 0.005 x 40 = 1.96 kW.

12. D. 12,000 L

12 units x 5 persons x 200 L = 12,000 L per day.

13. C. 4.32 m3

V = 2.4 x 1.2 x 1.5 = 4.32 m3.

14. A. 49.1 L

V = (pi/4)(0.025)^2(100) = 0.04909 m3 = 49.1 L.

15. B. 60 degrees C

C = (F - 32) x 5/9 = (140 - 32) x 5/9 = 60 degrees C.

16. A. 413.7 kPa

1 psi = 6.895 kPa, so 60 x 6.895 = 413.7 kPa.

17. D. 1,893 L

1 US gallon = 3.785 L, so 500 x 3.785 = 1,893 L.

18. B. 4.59 m

hf = f(L/D)(v^2/2g) = 0.02 x 2000 x (2.25/19.62) = 4.59 m.

19. D. 172.3 kPa

Elevation loss = 9.81 x 12 = 117.7 kPa; residual = 350 - 117.7 - 60 = 172.3 kPa.

20. D. 7.67 m/s

Torricelli: v = sqrt(2gh) = sqrt(2 x 9.81 x 3) = 7.67 m/s.

21. D. 11.1 L/s

Q = A x i = 400 m2 x 0.100 m/h = 40 m3/h = 40,000 / 3,600 = 11.1 L/s.

22. C. 60 mm

Change in length = alpha x L x dT = 0.00005 x 30 m x 40 = 0.060 m = 60 mm.

23. D. 24.5 kN

Mass = 2,500 kg; weight = 2,500 x 9.81 = 24,525 N = 24.5 kN.

24. B. 848.5 mm

For 45-degree fittings travel = offset x 1.414 = 600 x 1.414 = 848.5 mm.

25. B. 0.556 L/s

Rate = 4,000 L / 7,200 s = 0.556 L/s.

26. A. 50 mm

Required area = 0.003 / 2.0 = 0.0015 m2, so D = sqrt(4A/pi) = 43.7 mm; 40 mm is too small, so use 50 mm.

27. D. 205.7 kPa

Elevation loss = 9.81 x 30 = 294.3 kPa; remaining = 500 - 294.3 = 205.7 kPa.

28. B. 2.5 percent

1/40 = 0.025 = 2.5 percent.

29. C. 83.4 kPa

p = SG x 9.81 x h = 0.85 x 9.81 x 10 = 83.4 kPa.

30. A. 20 DFU

Total = 3(4) + 4(1) + 2(2) = 12 + 4 + 4 = 20 DFU.

31. C. It holds a water seal that blocks sewer gas from entering

The trap retains a water seal that stops sewer gases and vermin from entering the occupied space while letting waste pass.

32. A. To equalize air pressure so trap seals are not lost

Vents admit and release air so that siphonage and back pressure do not pull or blow out trap seals.

33. D. Self-siphonage of the trap

The fixture's own discharge fills the trap arm and siphons the seal out behind it, which is self-siphonage.

34. A. Anaerobic bacterial digestion

A septic tank is sealed from air, so retained sludge is broken down by anaerobic bacteria.

35. D. A grease interceptor before the sewer connection

A grease interceptor cools and separates fats and oils so they do not congeal and block the drainage system.

36. D. Install a water hammer arrester near the valve

The shock is water hammer from sudden flow stoppage; an arrester near the valve absorbs the pressure surge.

37. A. It can let contaminated water enter the potable supply

A cross-connection links potable and nonpotable systems, so backflow can carry contaminants into drinking water.

38. B. An air gap between outlet and flood rim

An air gap is a physical vertical separation that cannot fail mechanically, so it is the most dependable protection.

39. A. Discharge from showers, lavatories and laundry

Graywater is lightly soiled wastewater that excludes toilet and urinal wastes, which are blackwater.

40. A. The drain is within the building; the sewer runs outside to disposal

The building drain collects discharge inside the building and conveys it to a point just outside, where the building sewer continues to the public sewer or private disposal.

41. B. At changes of direction and at the base of stacks

Blockages tend to form where flow changes direction and where stacks turn horizontal, so access is placed there.

42. D. To release water if temperature or pressure gets unsafe

The T&P valve opens on excessive temperature or pressure, preventing the tank from rupturing or exploding.

43. A. Gravity from an elevated or rooftop tank

Water is lifted to an overhead tank and flows down to the fixtures, so pressure comes from the height of the water.

44. C. It maintains pressure and limits pump starts

Compressed air pushes stored water into the system so the pump does not start for every small demand.

45. D. Ordinary uPVC pressure pipe

Unplasticized PVC softens and loses strength at elevated temperature; copper, PPR and CPVC are made for hot water.

46. D. A dielectric union

Dissimilar metals in water form a galvanic cell; a dielectric union electrically isolates them.

47. D. Calcium and magnesium

Hardness is caused mainly by calcium and magnesium salts, which precipitate as scale when heated.

48. C. Flushing and disinfection with chlorine

New lines are flushed and chlorinated to destroy bacteria introduced during construction, then flushed again.

49. A. A percolation test

The percolation test measures how fast water soaks into the soil, which governs absorption field feasibility and size.

50. B. A relative load factor based on probable use and discharge

Fixture units are load factors that account for discharge rate, duration and frequency of use, not an actual flow.

51. B. A wet vent

A wet vent is a vent that also conveys waste from other fixtures.

52. A. It drains to a sump and is pumped up to the sewer

Fixtures below the sewer cannot drain by gravity, so they discharge into a sealed sump with an ejector pump.

53. C. A backwater valve on the drain serving them

A backwater valve lets flow out but closes against reverse flow from a surcharged sewer.

54. D. To absorb the volume increase as water is heated

Heated water expands; in a closed system the tank takes up that volume so pressure does not climb to the relief setting.

55. D. To keep velocity high enough to carry solids along

Adequate slope produces a self-cleansing velocity so solids do not settle and form blockages.

56. B. So an air space remains to keep pressures balanced

Partial flow leaves an air core or space that moves with the water and helps prevent pressure swings at traps.

57. C. A pressure reducing valve after the meter

A pressure reducing valve lowers and steadies the incoming pressure to a level suitable for fixtures.

58. A. To stop back-siphonage through an attached hose

A submerged hose end can siphon dirty water back into the supply when pressure drops; the vacuum breaker admits air to prevent this.

59. C. To provide extra air circulation between drain and vent

A relief vent supplements air flow between the drainage and vent systems, reducing pressure fluctuations in tall stacks.

60. C. Discharge from water closets or similar fixtures

A soil stack receives fecal waste from water closets or urinals; a waste stack carries only liquid wastes free of fecal matter.

61. B. Republic Act No. 1378

RA 1378 (1955) governs the practice of plumbing; RA 544 covers civil engineering, RA 9266 architecture and RA 7920 electrical engineering.

62. C. The Professional Regulation Commission

Licensure is handled by the Professional Regulation Commission through the Board of Master Plumbing.

63. D. Double trapping a fixture is prohibited

Two traps in series create an air lock between them that impedes flow, so a fixture must not be double trapped.

64. D. A trap that relies on moving parts for its seal

Traps that depend on movable parts or interior partitions are prohibited because the seal can fail.

65. A. It must not be reduced in size downstream

Reducing pipe size downstream would choke flow and promote stoppages, so drains may not decrease in size along the flow.

66. A. Indirectly, through an air gap or air break

Food storage equipment must discharge indirectly so sewage cannot back up into it.

67. A. Outdoors, open to the atmosphere above the roof

Vents must terminate to the open air so that sewer gases are released outdoors and air can enter freely.

68. A. So any moisture drains back by gravity to the drainage pipe

Vent pipes must be free of sags and slope back to the drainage system so condensate cannot block them.

69. B. Cleanouts must remain readily accessible

A cleanout is useless if it cannot be reached without demolition, so it must be accessible.

70. C. Flow into the potable supply from any other source

Backflow is the flow of water or other substances into the potable distribution system from any unintended source.

71. C. The extension of a soil or waste stack above the highest drain

The stack vent is the part of the soil or waste stack extending above the highest horizontal drain connected to it.

72. C. Along the centerline of the pipe and fittings

Developed length follows the actual path of the pipe, including fittings, along its centerline.

73. D. Less than 45 degrees from the horizontal

A pipe making an angle of less than 45 degrees with the horizontal is treated as horizontal.

74. B. Before it is covered or concealed

Tests are done while joints are still exposed so leaks can be found and repaired.

75. D. On the left side

The established convention places hot on the left and cold on the right.

76. B. A sleeve that protects the pipe and allows movement

Sleeves protect the pipe from damage and permit expansion and settlement without stressing it.

77. A. Ream it to remove burrs and restore full bore

Burrs reduce the bore and catch debris, so cut ends are reamed to the full inside diameter.

78. D. An inner ledge, shoulder or reduction

Fittings with ledges, shoulders or reductions retard flow and catch solids, so they are not permitted in drainage lines.

79. C. A wye or long-sweep fitting

Sanitary tees are meant for horizontal-to-vertical changes; horizontal-to-horizontal changes need wyes or long sweeps.

80. C. No, toilet waste must bypass the grease interceptor

Sewage solids would overload the interceptor and hinder grease separation, so water closet waste is kept out.

81. B. Storm water would overload and flush out the tank

Large storm flows hydraulically overload a septic tank, washing solids into the absorption field.

82. D. No, vents may not receive storm water

A vent filled with rainwater cannot pass air, so vents and storm leaders must be separate.

83. D. Full size to a safe, visible point of disposal

The relief line must not be reduced or blocked and must discharge where it is safe and can be observed.

84. A. A sand and oil interceptor

Sand and oil interceptors keep grit and petroleum products out of the sewer at service garages.

85. B. To limit the fouling surface and keep the seal effective

A long tailpiece above the trap becomes fouled and odorous and can promote seal loss, so the trap sits close to the outlet.

86. C. A capped branch extension with no connection or outlet

A dead end is a closed branch beyond the last connection where waste and gases stagnate, which codes restrict.

87. B. They are prohibited unless protected against backflow

Potable systems must be protected from contamination; unprotected cross-connections are not permitted.

88. A. A duly registered and licensed master plumber

RA 1378 limits the practice of master plumbing to persons registered and licensed under the law.

89. D. The pipe between the trap outlet and the vent connection

The trap arm is the portion of the fixture drain from the trap weir to the vent; its length is limited to protect the seal.

90. C. Water safe for drinking and domestic use

Potable water is water that meets drinking water standards and is safe for culinary and domestic use.

91. D. Inadequate venting causing induced siphonage

Discharge from the WC creates negative pressure in an under-vented branch, pulling the lavatory trap seal.

92. C. The trap seal evaporated; refill it or add a trap primer

Without regular use the water seal dries out; refilling the trap or providing a trap primer restores it.

93. A. Lower the float so the fill valve shuts off earlier

If the water level rises above the overflow, the fill valve is shutting too late; lowering the float corrects the level.

94. C. Install a booster pump for the upper floors

Top floors have very little height below the tank, so static pressure is low; a booster supplies the missing pressure.

95. A. Water hammer arresters at the machine supply valves

Rapid solenoid closure causes water hammer; arresters close to the valves absorb the shock.

96. B. The building drain or sewer, through the main cleanout

Lowest fixtures back up first when the main drain or sewer is partly blocked, so the main cleanout is the place to start.

97. B. Clean the tube and fitting, then apply flux

Solder only bonds to clean, fluxed metal; oxides and dirt prevent capillary flow of the solder.

98. A. Clean and prime, apply cement, insert with a quarter turn

Primer softens the surfaces, cement is applied while wet, and a quarter turn spreads it evenly before the joint sets.

99. B. By heat fusion of pipe and socket

PPR is joined by heating the pipe end and socket and pressing them together so they fuse into one piece.

100. D. Thread seal tape or pipe joint compound

Tape or compound fills the thread gaps to make the joint watertight and eases assembly.

101. B. A basin wrench

A basin wrench has a long shaft and swiveling jaw that reaches faucet nuts in the tight space behind a basin.

102. B. A closet auger

A closet auger has a protected bend and short cable sized to pass through the trapway of a WC.

103. A. The tank is overdue for desludging or the soil is clogged

Solids carried over from an overfull tank, or a saturated, clogged soil, keep effluent from soaking in.

104. C. Insulate the cold pipes to stop condensation

Warm humid air condenses on the cold pipe surface; insulation with a vapor barrier keeps the surface above dew point.

105. A. Close all fixtures and watch whether the meter moves

With all outlets closed, any meter movement means water is escaping somewhere in the system.

106. B. Internal corrosion of the steel pipes

Corroding galvanized pipe releases iron oxide into standing water, giving it a rusty color.

107. B. An air lock at a high point in the piping

Trapped air at a high spot can block low-pressure gravity flow; bleeding it out restores flow.

108. A. The angle valve and fill valve for partial closure or debris

Slow refill with good system pressure points to a restriction at the supply stop or a clogged fill valve screen.

109. D. Replace the worn washer or reface the seat

Dripping from a closed compression faucet results from a worn washer or damaged seat that no longer seals.

110. B. The tank has lost its air charge and is waterlogged

Without an air cushion the tank stores almost no water, so pressure collapses quickly and the pump short-cycles.

111. C. The distance from the finished wall to the center of the outlet

Water closets are made for specific rough-in distances, measured from the finished wall to the center of the floor outlet.

112. B. On firm, uniform bedding free of rocks

Continuous, even bedding prevents point loads and settlement that could crack the pipe or create sags.

113. D. Shut off the controlling valve and drain the line

Isolating and draining the section prevents flooding and lets the new fitting be installed safely.

114. C. Install a properly sized thermal expansion tank

Heated water has nowhere to expand in a closed system, so pressure rises to the relief setting; an expansion tank absorbs it.

115. C. To find leaks and defects in the drain and vent piping

Smoke escaping at joints, cracks or dry traps shows where sewer gas could enter the building.

116. C. Realign and tighten the nut, replacing the washer if worn

Slip joints seal by compressing a beveled washer; realigning, tightening or renewing the washer stops the leak.

117. A. Avoid pouring cooking grease down the sink

Grease cools and coats the pipe interior, catching food particles; keeping grease out prevents repeated clogs.

118. A. Debris lodged in the faucet aerators

Main repairs stir up sediment that collects in aerator screens; cleaning them restores flow.

119. C. A faulty mixing valve letting hot cross into cold

A failed mixing or single-handle valve cartridge can let pressurized hot water migrate into the cold lines.

120. B. A tubing cutter

A tubing cutter's rotating wheel gives a clean, square cut without crushing the thin copper wall.

Topics to review

• Water supply and distribution layouts

• Drainage, waste and vent systems

• Fixture sizing and isometric interpretation

• Plumbing code and inspection principles

Online question banks and study resources

Master Plumbing - Pass Harbor (Question bank)

Official PRC board information

Current PRC exam programs

Independent study material prepared by Board Exam Desk.