ANSWER SHEET • Oregon: UPC Chapters 7-9 • Course No. 5000123V

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1.	A B C D	21.	A B C D	41.	A B C D	61.	A B C D
2.	A B C D	22.	A B C D	42.	A B C D	62.	A B C D
3.	A B C D	23.	A B C D	43.	A B C D	63.	A B C D
4.	A B C D	24.	A B C D	44.	A B C D	64.	A B C D
5.	A B C D	25.	A B C D	45.	A B C D	65.	A B C D
6.	A B C D	26.	A B C D	46.	A B C D	66.	A B C D
7.	A B C D	27.	A B C D	47.	A B C D	67.	A B C D
8.	A B C D	28.	A B C D	48.	A B C D	68.	A B C D
9.	A B C D	29.	A B C D	49.	A B C D	69.	A B C D
10.	A B C D	30.	A B C D	50.	A B C D	70.	A B C D
11.	A B C D	31.	A B C D	51.	A B C D	71.	A B C D
12.	A B C D	32.	A B C D	52.	A B C D	72.	A B C D
13.	A B C D	33.	A B C D	53.	A B C D	73.	A B C D
14.	A B C D	34.	A B C D	54.	A B C D	74.	A B C D
15.	A B C D	35.	A B C D	55.	A B C D	75.	A B C D
16.	A B C D	36.	A B C D	56.	A B C D	76.	A B C D
17.	A B C D	37.	A B C D	57.	A B C D	77.	A B C D
18.	A B C D	38.	A B C D	58.	A B C D	78.	A B C D
19.	A B C D	39.	A B C D	59.	A B C D	79.	A B C D
20.	A B C D	40.	A B C D	60.	A B C D	80.	A B C D

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Oregon: UPC Chapters 7-9

701.3.1 Screwed Pipe. Fittings on screwed pipe shall be of the recessed drainage type. Burred ends shall be reamed to the full bore of the pipe.

701.3.2 Threads. The threads of drainage fittings shall be tapped so as to allow 1⁄4 inch per foot (20.8 mm/m) grade.

701.3.3 Type. Fittings used for drainage shall be of the drainage type, have a smooth interior water-way, and be constructed so as to allow 1⁄4 inch per foot (20.8 mm/m) grade.

701.5 Lead. (See Chapter 17) Sheet lead shall be not less than the following:

(1) For safe pans – not less than 4 pounds per square foot lb/ft2 (19 kg/m2) or 1⁄16 of an inch (1.6 mm) thick.

(2) For flashings or vent terminals – not less than 3 lb/ft2 (15 kg/m2) or 0.0472 of an inch (1.1989 mm) thick.

(3) Lead bends and lead traps shall be not less than 1⁄8 of an inch (3.2 mm) wall thickness.

705.1.2 Solvent Cement Joints. Solvent cement joints for ABS pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, solvent cement in accordance with ASTM D 2235 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly.

705.1.3 Threaded Joints. Threads shall comply with ASME B1.20.1. A minimum of Schedule 80 shall be permitted to be threaded. Molded threads on adapter fittings for transition to threaded joints shall be permitted. Thread sealant compound shall be applied to male threads, insoluble in water, and nontoxic. The joint between the pipe and transition fitting shall be of the solvent cement type. Caution shall be used during assembly to prevent over tightening of the ABS components once the thread sealant compound has been applied.

705.3.1 Brazed Joints. Brazed joints between copper or copper alloy pipe and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Piping shall be cut square and reamed to full inside diameter. Brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. Brazing filler metal in accordance with AWS A5.8 shall be applied at the point where the pipe or tubing enters the socket of the fitting.

705.3.2 Mechanical Joints. Mechanical joints in copper or copper alloy piping shall be made with a mechanical coupling with grooved end piping or approved joint designed for the specific application.

705.3.4 Threaded Joints. Threaded joints for copper or copper alloy pipe shall be made with pipe threads that

comply with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

705.3.3 Soldered Joints. Soldered joints between copper pipe and fittings shall be made in accordance with ASTM B 828 with the following sequence of joint preparation and operation as follows: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling, and cleaning. Pipe shall be cut square and reamed to the full inside diameter including the removal of burrs on the outside of the pipe. Surfaces to be joined shall be cleaned bright by manual or mechanical means. Flux shall be applied to pipe and fittings and shall be in accordance with ASTM B 813, and shall become noncorrosive and nontoxic after soldering. Insert pipe into the base of the fitting and remove excess flux. Pipe and fitting shall be supported to ensure a uniform capillary space around the joint. Heat shall be applied using an air or fuel torch with the flame perpendicular to the pipe using acetylene or an LP gas. Preheating shall depend on the size of the joint. The flame shall be moved to the fitting cup and alternate between the pipe and fitting. Solder conforming to ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup. Joint surfaces shall not be disturbed until cool and any remaining flux residue shall be cleaned.

Exam Questions:

1. The fittings on screwed drainage pipe are required to be of the _____.
- A. Recessed drainage type
- B. Smooth Bore type
- C. Corrosion resistant type
- D. Fiberglass reinforced type

2. Threaded drainage fittings are required to be tapped to allow _____ per foot grade.
- A. 5/8″
- B. 1/4″
- C. 1/8″
- D. No requirement

3. What is the minimum acceptable thickness for the lead used when making a safe pan?
- A. 1/4"
- B. 1/8″
- C. 1/32″
- D. 1/16″

4. What are the mechanical joints in copper alloy piping required to be made with?
- A. Mechanical Coupling
- B. Solid Rubber gasket
- C. Expandable Coupling
- D. Irreversible Threads

5. How long are you required to leave ABS joints undisturbed after they are glued?
- A. 1 Minute
- B. 20 Minutes
- C. 5 Minutes
- D. There are no time requirements

6. What is the minimum schedule that ABS threaded fittings can be made from?
- A. 40
- B. 80
- C. 60
- D. 20

7. What is the minimum listed temperature for liquid brazing alloys?
- A. 900°C
- B. 538°F
- C. 1000°F
- D. 500-550°F

8. If using thread sealant compound for brass fittings, the compound can only be placed on the _____.
- A. Sealant compound cannot be used for brass fittings
- B. Female end
- C. Coupling
- D. Male threads

9. Brazing filler metal should be applied where the pipe enters the _____.

A. Socket of the fitting
B. Valve body
C. Fixture
D. Hand valve

10. What ASTM B are you required to reference for soldered joints between copper pipe and fittings?

A. 728
B. 813
C. 32
D. 828

11. What ASTM B are you required to reference for Flux applied to pipe and fittings?

A. 813
B. 828
C. 32
D. 728

12. What ASTM B are you required to reference for solder used with copper pipe and fittings?

A. 828
B. 32
C. 813
D. 728

705.6 Galvanized Steel Pipe and Joints. Joining methods for galvanized steel pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 705.4.1 and Section 705.4.2.

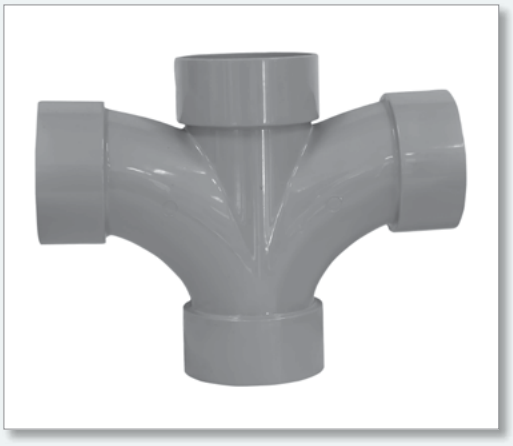
705.4.1 Mechanical Joints. Mechanical joints shall be made with an elastomeric gasket.

705.4.2 Threaded Joints. Threaded joints shall be made with pipe threads that comply with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

705.5.1 Mechanical Joints. Mechanical joints shall be designed to provide a permanent seal and shall be of the mechanical or push-on joint type. The push-on joint shall include an elastomeric gasket in accordance with ASTM D 3212 and shall provide a compressive force against the spigot and socket after assembly to provide a permanent seal.

705.5.2 Solvent Cement Joints. Solvent cement joints for PVC pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and pipe shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, apply primer purple in color in accordance with ASTM F 656. Primer shall be applied until the surface of the pipe and fitting is softened. Solvent cements in accordance with ASTM D 2564 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly.

705.10.2 Copper or Copper Alloy Pipe to Threaded Pipe Joints. Joints from copper or copper alloy pipe or tubing to threaded pipe shall be made by the use of a listed copper alloy adapter or dielectric fitting. The joint between the copper or copper alloy pipe and the fitting shall be a soldered or brazed, and the connection between the threaded and the fittings shall be made with a standard pipe size threaded joint.



706.0 Changes in Direction of Drainage Flow.

706.1 Approved Fittings. Changes in direction of drainage piping shall be made by the appropriate use of approved fittings and shall be of the angles presented by a one-sixteenth bend, one-eighth bend, or one-sixth bend, or other approved fittings of equivalent sweep.

706.2 Horizontal to Vertical. Horizontal drainage lines, connecting with a vertical stack, shall enter through 45 degree (0.79 rad) wye branches, 60 degree (1.05 rad) wye branches, combination wye and one-eighth bend branches, sanitary tee or sanitary tapped tee branches, or other approved fittings of equivalent sweep. No fitting having more than one inlet at the same level shall be used unless such fitting is constructed so that the discharge from one inlet cannot readily enter any other inlet. Double sanitary tees shall be permitted to be used where the barrel of the fitting is not less than two pipe sizes larger than the largest inlet, (pipe sizes recognized for this purpose are 2 inches, 21⁄2 inches, 3 inches, 31⁄2 inches, 4 inches, 41⁄2 inches, 5 inches, 6 inches, etc.) (50, 65, 80, 90, 100, 115, 125, 150 mm, etc.).

707.0 Cleanouts.

707.1 Plug. Each cleanout fitting for cast-iron pipe shall consist of a cast-iron or brass body and an approved plug. Each cleanout for galvanized wrought-iron, galvanized steel, copper, or brass pipe shall consist of a brass plug as specified in Table 707.1, or a standard weight brass cap, or an approved ABS or PVC plastic plug, or an approved stainless steel cleanout or plug. Plugs shall have raised square heads or approved countersunk rectangular slots.

707.3 Watertight and Gastight. Cleanouts shall be designed to be watertight and gastight.

Exam Questions:

13. Galvanized Steel Pipe and Joints are required to be joined by _____.
- A. 705.6.2
- B. 705.6.1
- C. The manufacturer's instructions
- D. All listed answers

14. What ASTM are you required to reference for pipe threads and fittings used with galvanized steel pipe?
- A. 32
- B. 813
- C. B1.20.1
- D. 728

15. A push-on joint for PVC pipe should provide _____.
- A. Easy access
- B. A permanent seal
- C. An attachment point
- D. All listed answers

16. PVC joint primer is required to comply with _____.
- A. ASTM F 656
- B. ASME B1.20.1
- C. ASTM B 813
- D. ASTM D 3212

17. What type of fitting should be used to join copper pipe to threaded pipe joints?
- A. Dielectric
- B. Expansion
- C. Push on
- D. All listed answers

18. If changing the direction of drainage piping, the fittings are required to be of what listed standard bend angles?
- A. One-sixth
- B. One-sixteenth
- C. One-eighth
- D. All Listed answers

19. When connecting a horizontal drainage line to a vertical stack, a double sanitary tee can be used where the barrel of the fitting is not less than _____ pipe size(s) larger than the largest inlet.
- A. One
- B. Two
- C. Three
- D. No such requirement

20. What table should you reference to determine the plug needed for a galvanized wrought-iron cleanout?
- A. 707.4
- B. 607.1
- C. 707.1
- D. 706.1

21. Cleanouts are required to be?
- A. B and C
- B. Gas Tight
- C. Water Tight
- D. Pressure activated

707.5 Cleaning. Each cleanout shall be installed so that it opens to allow cleaning in the direction of flow of the soil or waste or at right angles thereto and, except in the case of wye branch and end-of-line cleanouts, shall be installed vertically above the flow line of the pipe.

708.0 Grade of Horizontal Drainage Piping.
708.1 General. Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than 1⁄4 inch per foot (20.8 mm/m) or 2 percent toward the point of disposal provided that, where it is impractical due to the depth of the street sewer, to the structural features, or to the arrangement of a building or structure to obtain a slope of 1⁄4 inch per foot (20.8 mm/m) or 2 percent, such pipe or piping 4 inches (100 mm) or larger in diameter shall be permitted to have a slope of not less than 1⁄8 inch per foot (10.4 mm/m) or 1 percent, where first approved by the Authority Having Jurisdiction.

710.1 Backflow Protection. Fixtures installed on a floor level that is lower than the next upstream manhole cover of the public or private sewer shall be protected from back- flow of sewage by installing an approved type of backwater valve. Fixtures on such floor level that are not below the next upstream manhole cover shall not be required to be protected by a backwater valve. Fixtures on floor levels above such elevation shall not discharge through the backwater valve. Cleanouts for drains that pass through a backwater valve shall be clearly identified with a permanent label stating, "backwater valve downstream".

710.4 Discharge Line. The discharge line from such ejector, pump, or other mechanical device shall be of an approved pressure rated material and be provided with an accessible backwater or swing check valve and gate or ball valve. Where the gravity drainage line to which such discharge line connects is horizontal, the method of connection shall be from the top through a wye branch fitting. The gate or ball valve shall be located on the discharge side of the backwater or check valve.

Exam Questions:

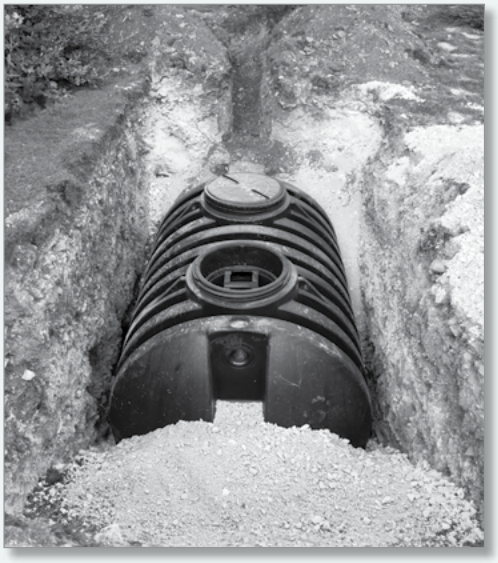
22. True or False? A cleanout shall be installed so that it opens to allow cleaning in the direction of flow.
A. True
B. False

23. What is the minimum uniform slope per foot for horizontal drainage piping to be run?
A. 1⁄8 inch
B. 1⁄4 inch
C. 3⁄16 inch
D. 3⁄8 inch

24. Fixtures that are installed on a floor level that is lower than the next upstream manhole cover of the public or private sewer are required be protected from?
A. Flow Rate
B. Siphonage
C. Pressure
D. Back- flow of sewage

25. The discharge line from a sewage pump needs to have a backwater or swing check valve and gate or ball valve that is?
A. Readily Accessible
B. Accessible
C. Schedule 40 PVC
D. Schedule 80 PVC

710.10 Sump and Receiving Tank Covers and Vents. Sumps and receiving tanks shall be provided with substantial covers having a bolt-and-gasket- type manhole or equivalent opening to permit access for inspection, repairs, and cleaning. The top shall be provided with a vent pipe that shall extend separately through the roof or, where permitted, be combined with other vent pipes. Such vent shall be large enough to maintain atmospheric pressure within the sump under normal operating conditions and, in no case, shall be less in size than that required by Table 703.2 for the number and type of fixtures discharging into the sump, nor less than 1½ inches (40 mm) in diameter. Where the foregoing requirements are met and the vent, after leaving the sump, is combined with vents from fixtures discharging into the sump, the size of the combined vent need not exceed that required for the total number of fixtures discharging into the sump. No vent from an air operating sewage ejector shall combine with other vents.



710.11 Air Tanks. Air tanks shall be so proportioned as to be of equal cubical capacity to the ejectors connected there with in which there shall be maintained an air pressure of not less than 2 pounds per foot (lb/ft) (3 kg/m) of height the sewage is to be raised. No water-operated ejectors shall be permitted.

710.12 Grinder Pump Ejector. Grinder pumps shall be permitted to be used.

710.12.1 Discharge Piping. The discharge piping shall be sized in accordance with the manufacturer's installation instructions and shall be not less than 1¼ inches (32 mm) in diameter. A check valve and full way type shutoff valve shall be located within the discharge line.

712.1 Media. The piping of the plumbing, drainage, and venting systems shall be tested with water or air except that plastic pipe shall not be tested with air. The Authority Having Jurisdiction shall be permitted to require the removal of cleanouts, etc., to ascertain whether the pressure has reached all parts of the system. After the plumbing fixtures have been set and their traps filled with water, they shall be submitted to a final test.

712.2 Water Test. The water test shall be applied to the drainage and vent systems either in its entirety or in sections. Where the test is applied to the entire system, openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. Where the system is tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 foot (3048 mm) head of water. In testing successive sections, not less than the upper 10 feet (3048 mm) of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet (3048 mm) of the system) shall have been submitted to a test of less than a 10 foot (3048 mm) head of water. The water shall be kept in the system, or in the portion under test, for not less than 15 minutes before inspection starts. The system shall then be tight at points.

712.3 Air Test. The air test shall be made by attaching an air compressor testing apparatus to a suitable opening and, after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of 5 pounds-force per square inch (psi) (34 kPa) or sufficient to balance a column of mercury 10 inches (34 kPa) in height. The pressure shall be held without introduction of additional air for a period of not less than 15 minutes.

801.2 Air Gap or Air Break Required. Indirect waste piping shall discharge into the building drainage system through an air gap or air break as set forth in this code. Where a drainage air gap is required by this code, the minimum vertical distance as measured from the lowest point of the indirect waste pipe or the fixture outlet to the flood-level rim of the receptor shall be not less than 1 inch (25.4 mm).

801.3.1 Size of Indirect Waste Pipes Except for refrigeration coils and ice-making machines, the size of the indirect waste pipe shall be not smaller than the drain on the unit, but shall be not smaller than 1 inch (25 mm), and the maximum developed length shall not exceed 15 feet (4572 mm). Indirect waste pipe for ice making machines shall be not less than the drain on the unit, and in no case less than 3⁄4 of an inch (20 mm).

Exam Questions:

26. True or False? The vent from an air operating sewage ejector is required to combine with other vents.
A. True
B. False

27. Air tanks are required to be proportioned so they can be of equal _____capacity to any ejectors connected.
A. External
B. Cubical
C. Storage
D. Overage

28. What is the minimum size discharge pipe that can be used for a grinder pump ejector?
A. 1 1⁄4 inches
B. 1 1⁄2 inches
C. 2 inches
D. 3⁄4 inches

29. True or False? Plastic pipe is required to be tested with air before final inspection will pass.
A. True
B. False

30. What is the minimum head of water required for a drainage and vent system water test?
A. 5 foot
B. 15 foot
C. 10 foot
D. No Such requirement

31. How long is a drainage system required to have water in it before an inspection can start?
A. 35 minutes
B. 15 minutes
C. 25 minutes
D. 30 minutes

32. How long is an air test required to be held without adding additional air?
A. 15 minutes
B. 35 minutes
C. 25 minutes
D. 30 minutes

33. Indirect waste piping is required to discharge into the building drainage system through what listed term(s)?
A. B and C
B. Air gap
C. Air break
D. No Requirement

34. What is the minimum size that an indirect waste pipe must be?
A. 1 1/4 inch
B. 3/4 inch
C. 1/2 inch
D. 1 inch

35. What is the minimum size that an indirect waste pipe must be for an ice making machine?
A. 1 inch
B. 3/4 inch
C. 1/2 inch
D. 1 1/4 inch

801.3.2 Walk-In Coolers. For walk-in coolers, floor drains shall be permitted to be connected to a separate drainage line discharging into an outside receptor. The flood-level rim of the receptor shall be not less than 6 inches (152 mm) lower than the lowest floor drain.

Such floor drains shall be trapped and individually vented. Cleanouts shall be provided at 90 degree (1.57 rad) turns and shall be accessibly located. Such waste shall discharge through an air gap or air break into a trapped and vented receptor, except that a full-size air gap is required where the indirect waste pipe is under vacuum.

801.3.3 Food-Handling Fixtures. Food-preparation sinks, steam kettles, potato peelers, ice cream dipper wells, and similar equipment shall be indirectly connected to the drainage system by means of an air gap. Bins, sinks, and other equipment having drainage connections and used for the storage of unpackaged ice used for human ingestion, or used in direct contact with ready-to-eat food, shall be indirectly connected to the drainage system by means of an air gap. Each indirect waste pipe from food-handling fixtures or equipment shall be separately piped to the indirect waste receptor and shall not combine with other indirect waste pipes. The piping from the equipment to the receptor shall be not less than the drain on the unit, and in no case less than 1⁄2 of an inch (15 mm).

801.4 Bar and Fountain Sink Traps. Where the sink in a bar, soda fountain, or counter is so located that the trap serving the sink cannot be vented, the sink drain shall discharge through an air gap or air break (see Section 801.2.3) into an approved receptor that is vented. The developed length from the fixture outlet to the receptor shall not exceed 5 feet (1524 mm).

801.6 Sterilizers. Lines, devices, or apparatus such as stills, sterilizers, and similar equipment requiring waste connections and used for sterile materials shall be indirectly connected by means of an air gap. Each such indirect waste pipe shall be separately piped to the receptor and shall not exceed 15 feet (4572 mm). Such receptors shall be located in the same room.

803.0 Indirect Waste Piping.

803.3 Pipe Size and Length. Except as hereinafter provided, the size and construction of indirect waste piping shall be in accordance with other sections of this code applicable to drainage and vent piping. No vent from indirect waste piping shall combine with a sewer-connected vent, but shall extend separately to the outside air. Indirect waste pipes exceeding 5 feet (1524 mm), but less than 15 feet (4572 mm) in length shall be directly trapped, but such traps need not be vented.

Indirect waste pipes less than 15 feet (4572 mm) in length shall be not less than the diameter of the drain outlet or tailpiece of the fixture, appliance, or equipment served, and in no case less than 1⁄2 of an inch (15 mm). Angles and changes of direction in such indirect waste pipes shall be provided with cleanouts so as to permit flushing and cleaning.

804.0 Indirect Waste Receptors.

804.1 Standpipe Receptors. Plumbing fixtures or other receptors receiving the discharge of indirect waste pipes shall be approved for the use proposed and shall be of such shape and capacity as to prevent splashing or flooding and shall be located where they are readily accessible for inspection and cleaning. No standpipe receptor for a clothes washer shall extend more than 30 inches (762 mm), or not less than 18 inches (457 mm) above its trap weir. No trap for a clothes washer standpipe receptor shall be installed below the floor, but shall be roughed in not less than 6 inches (152 mm) and not more than 18 inches (457 mm) above the floor. No indirect waste receptor shall be installed in a toilet room, closet, cupboard, or storeroom, nor in a portion of a building not in general use by the occupants thereof; except standpipes for clothes washers shall be permitted to be installed in toilet and bathroom areas where the clothes washer is installed in the same room.

Exam Questions:

36. The flood-level rim of a receptor cannot be installed less than _____lower than the lowest floor drain.
A. 2 inches
B. 4 inches
C. 8 inches
D. 6 inches

37. Would it be considered acceptable or a violation of this code to combine the indirect waste pipes of equipment used for the storage of unpackaged ice used for human ingestion?
A. Acceptable
B. Violation

38. What is the maximum developed length for a fixture outlet to a receptor being used for a bar sink vent if the trap serving the sink cannot be vented?
A. 8 feet
B. 4 feet
C. 5 feet
D. 2 feet

39. A still that requires a waste connection used for sterile materials must have its waste pipe connected to a receptor at a maximum of _____.
A. 20 feet
B. 10 feet
C. 5 feet
D. 15 feet

40. Would it be considered acceptable or a violation of this code to combine the vent from an indirect waste pipe with a sewer-connected vent?
A. Acceptable
B. Violation

41. An indirect waste pipe that exceeds_____, but less than _____in length is required to be directly trapped.
A. 5 feet, 15 feet
B. 10 feet, 25 feet
C. 7 feet, 18 feet
D. 12 feet, 25 feet

42. What is the maximum distance a standpipe receptor for a clothes washer can extend from its trap weir?
A. 6 inches
B. 18 inches
C. 24 inches
D. 30 inches

43. What is the minimum distance a standpipe receptor for a clothes washer can extend above its trap weir?
A. 30 inches
B. 18 inches
C. 24 inches
D. 6 inches

44. What is the minimum distance the trap for a clothes washer standpipe receptor can be roughed in above finish floor?
A. 30 inches
B. 18 inches
C. 24 inches
D. 6 inches

45. What is the maximum distance the trap for a clothes washer standpipe receptor can be roughed in above finish floor?
A. 30 inches
B. 18 inches
C. 24 inches
D. 6 inches

806.0 Sterile Equipment.

806.1 General. Appliances, devices, or apparatus such as stills, sterilizers, and similar equipment requiring water and waste and used for sterile materials shall be drained through an air gap.

807.1 Non-Classed Apparatus. Commercial dishwashing machines and other appliances, devices, equipment, or other apparatus not regularly classed as plumbing fixtures, which are equipped with pumps, drips, or drainage outlets, shall be permitted to be drained by indirect waste pipes discharging into an approved type of open receptor.

807.2 Undiluted Condensate Waste. Where undiluted condensate waste from a fuel-burning condensing appliance is discharged into the drainage system, the material in the drainage system shall be cast-iron, galvanized iron, plastic, or other materials approved for this use.

Exceptions:

(1) Where the above condensate is discharged to an exposed fixture tailpiece and trap, such tailpiece and trap shall be permitted to be brass.

(2) Materials approved in Section 701.0 shall be permitted to be used where data is provided that the condensate waste is adequately diluted.

807.3 Domestic Dishwashing Machine. No domestic dishwashing machine shall be directly connected to a drainage system or food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine. Listed air gaps shall be installed with the flood-level (FL) marking at or above the flood level of the sink or drainboard, whichever is higher.

808.0 Cooling Water.

808.1 General. Where permitted by the Authority Having Jurisdiction, clean running water used exclusively as a cooling medium in an appliance, device, or apparatus shall be permitted to discharge into the drainage system through the inlet side of a fixture trap in the event that a suitable fixture is not available to receive such discharge. Such trap connection shall be by means of a pipe connected to the inlet side of an approved fixture trap, the upper end terminating in a funnel-shaped receptacle set adjacent, and not less than 6 inches (152 mm) above the overflow rim of the fixture.

809.0 Drinking Fountains.

809.1 General. Drinking fountains shall be permitted to be installed with indirect wastes.

810.0 Steam and Hot Water Drainage Condensers and Sumps.

810.1 High Temperature Discharge. No steam pipe shall be directly connected to a plumbing or drainage system, nor shall water having a temperature above 140°F (60°C) be discharged under pressure directly into a drainage system. Pipes from boilers shall discharge by means of indirect waste piping, as determined by the Authority Having Jurisdiction or the boiler manufacturer's recommendations. Such pipes shall be permitted to be indirectly connected by discharging into an open or closed condenser or an intercepting sump of an approved type that will prevent the entrance of steam or such water under pressure into the drainage system. Closed condensers or sumps shall be provided with a vent that shall be taken off the top and extended separately, full size above the roof. Condensers and sumps shall be properly trapped at the outlet with a deep seal trap extending to within 6 inches (152 mm) of the bottom of the tank. The top of the deep seal trap shall have a 3⁄4 of an inch (19.1 mm) opening located at the highest point of the trap to serve as a siphon breaker. Outlets shall be taken off from the side in such a manner as to allow a waterline to be maintained that will permanently occupy not less than one-half the capacity of the condenser or sump. Inlets shall enter above the waterline.

Wearing plates or baffles shall be installed in the tank to protect the shell. The sizes of the blowoff line inlet, the water outlets, and the vent shall be as shown in Table 810.1. The contents of condensers receiving steam or hot water under pressure shall pass through an open sump before entering the drainage system.

Exam Questions:

46. An appliance with a pump not regularly classed as plumbing fixture can be drained by an indirect waste pipe into an "approved _____".

A. Open Receptor
B. Floor Drain
C. Lead Pan
D. Filter

47. Where are you required to install the air gap fitting on a domestic dishwashing machine?

A. Garbage disposal side
B. Inlet side
C. Discharge side
D. No such requirement

48. What is the maximum temperature water can be discharged under pressure directly into a drainage system?

A. 90°F
B. 60°F
C. 130°F
D. 140°F

49. The traps for condensers or sumps used with steam lines are required to extend within _____ of the bottom of the tank.

A. 8 inches
B. 6 inches
C. 4 inches
D. 3 inches

50. What size opening is required for a siphon breaker located at the top of a deep seal trap?

A. 1 inch
B. 1/2 inch
C. 3/4 inch
D. 1/4 inch

810.2 Sumps, Condensers, and Intercepting Tanks. Sumps, condensers, or intercepting tanks that are constructed of concrete shall have walls and bottom not less than 4 inches (102 mm) in thickness, and the inside shall be cement plastered not less than 1⁄2 of an inch (12.7 mm) in thickness. Condensers constructed of metal shall be not less than No. 12 U.S. standard gauge (0.109 inch) (2.77 mm), and such metal condensers shall be protected from external corrosion by an approved bituminous coating.

810.4 Strainers. An indirect waste interceptor receiving discharge-containing particles that would clog the receptor drain shall have a readily removable beehive strainer.

811.0 Chemical Wastes.

811.1 Pretreatment. Chemical or industrial liquid wastes that are likely to damage or increase maintenance costs on the sanitary sewer system, detrimentally affect sewage treatment, or contaminate surface or subsurface waters shall be pretreated to render them innocuous prior to discharge into a drainage system. Detailed plans and specifications of the pretreatment facilities shall be required by the Authority Having Jurisdiction. Piping conveying industrial, chemical, or process wastes from their point of origin to sewer-connected pretreatment facilities shall be of such material and design as to adequately perform its intended function to the satisfaction of the Authority Having Jurisdiction. Drainage discharge piping from pretreatment facilities or interceptors shall be in accordance with standard drainage installation procedures. Copper or copper alloy tube shall not be used for chemical or industrial wastes as defined in this section.

811.2 Waste and Vent Pipes. Each waste pipe receiving or intended to receive the discharge of a fixture into which acid or corrosive chemical is

placed, and each vent pipe connected thereto, shall be constructed of Chlorinated Poly(vinyl-chloride) (CPVC), Polypropylene (PP), Polyvinylidene Fluoride (PVDF), chemical-resistant glass, high-silicon iron pipe, or lead pipe with a wall thickness of not less than 1⁄8 of an inch (3.2 mm); an approved type of ceramic glazed or unglazed vitrified clay; or other approved corrosion-resistant materials. CPVC pipe and fittings shall comply with ASTM F2618. PP pipe and fittings shall comply with ASTMF1412 or CSA B181.3. Chemical-resistant glass pipe and fittings shall comply with ASTM C1053. High-silicon iron pipe and fittings shall comply with ASTM A861.

811.8 Diluted Chemicals. The provisions in this section relative to materials and methods of construction shall not apply to installations such as photographic or x-ray dark rooms or research or control laboratories where minor amounts of adequately diluted chemicals are discharged.

812.0 Clear Water Wastes.

812.1 General. Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, or similar devices that discharge clear wastewater into the building drainage system shall discharge through an indirect waste.

813.0 Swimming Pools.

813.1 General. Pipes carrying wastewater from swimming or wading pools, including pool drainage and backwash from filters, shall be installed as an indirect waste. Where a pump is used to discharge waste pool water to the drainage system, the pump discharge shall be installed as an indirect waste.

814.0 Condensate Wastes and Control.

814.1 Condensate Disposal. Condensate from air washers, air-cooling coils, fuel-burning condensing appliances, the overflow from evaporative coolers, and similar water-supplied equipment or similar air-conditioning equipment shall be collected and discharged to an approved plumbing fixture or disposal area. Where discharged into the drainage system, equipment shall drain by means of an indirect waste pipe. The waste pipe shall have a slope of not less than 1⁄8 inch per foot (10.4 mm/m) or 1 percent slope and shall be of approved corrosion-resistant material not smaller than the outlet size in accordance with Section 814.3 or Section 814.4 for air cooling coils or condensing appliances, respectively. Condensate or wastewater shall not drain over a public way.

Exam Questions:

51. Condensate is never allowed to drain _____.
- A. By means of a direct waste pipe
- B. By means of an indirect waste pipe
- C. Over a public way
- D. No special requirement

52. What is the minimum required thickness of an intercepting tanks sidewalls and bottom constructed of concrete?
- A. 6 inches
- B. 8 inches
- C. 4 inches
- D. 3 inches

53. What type of strainer is required for an indirect waste interceptor receiving discharge-containing particles that would clog the receptor drain?
- A. Beehive
- B. Clear
- C. Elongated
- D. Compact

54. An expansion tank can discharge its clear water waste through a (an) _____ waste pipe to the drainage system.
- A. Direct connected
- B. Indirect
- C. Treated
- D. All listed answers

901.0 General.

901.2 Vents Required. Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage and backpressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.

901.3 Trap Seal Protection. The vent system shall be designed to prevent a trap seal from being exposed to a pressure differential that exceeds 1 inch water column (0.24 kPa) on the outlet side of the trap.

902.0 Vents Not Required.

902.1 Interceptor. Vent piping shall be permitted to be omitted on an interceptor where such interceptor acts as a primary settling tank and discharges through a horizontal indirect waste pipe into a secondary interceptor. The second interceptor shall be properly trapped and vented.

902.2 Bars, Soda Fountains, and Counter. Traps serving sinks that are part of the equipment of bars, soda fountains, and counters need not be vented where the location and construction of such bars, soda fountains, and counters is such as to make it impossible to do so. Where such conditions exist, said sinks shall discharge by means of approved indirect waste pipes into a floor sink or other approved type of receptor.

903.2.3 Marking. Copper or copper alloy tubing, in addition to the required incised marking, shall be marked in accordance with either ASTM B 306 or ASTM B 88 as listed in Table 1701.1. The colors shall be: Type K, green; Type L, blue; Type M, red; and Type DWV, yellow.

903.3 Changes in Direction. Changes in direction of vent piping shall be made by the appropriate use of approved fittings, and no such pipe shall be strained or bent. Burred ends shall be reamed to the full bore of the pipe.

Exam Questions:

55. All plumbing fixture traps are required to be protected from?

A. Poor air circulation
B. Siphonage
C. Backpressure
D. All listed answers

56. What color is type K hard-drawn copper tubing required to be?

A. Green
B. Blue
C. Red
D. Yellow

57. What color is type M hard-drawn copper tubing required to be?

A. Green
B. Blue
C. Red
D. Yellow

58. Vent pipe is required to be _____.

A. Strained
B. Bent
C. De-Burred
D. All listed answers

904.0 Size of Vents.

904.1 Size. The size of vent piping shall be determined from its length and the total number of fixture units connected thereto, in accordance with Table 703.2. The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. In addition, the drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross sectional area of which shall be not less than that of the largest required building sewer, as determined from Table 703.2. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

905.0 Vent Pipe Grades and Connections.

905.1 Grade. Vent and branch vent pipes shall be free from drops or sags, and each such vent shall be level or shall be so graded and connected as to drip back by gravity to the drainage pipe it serves.

905.2 Horizontal Drainage Pipe. Where vents connect to a horizontal drainage pipe, each vent pipe shall have its invert taken off above the drainage centerline of such pipe downstream of the trap being served.

905.3 Vent Pipe Rise. Unless prohibited by structural conditions, each vent shall rise vertically to a point not less than 6 inches (152 mm) above the flood-level rim of the fixture served before offsetting horizontally, and where two or more vent pipes converge, each such vent pipe shall rise to a point not less than 6 inches (152 mm) in height above the flood-level rim of the plumbing fixture it serves before being connected to any other vent. Vents less than 6 inches (152 mm) above the flood-level rim of the fixture shall be installed with approved drainage fittings, material, and grade to the drain.

905.4 Roof Termination. Vent pipes shall extend undiminished in size above the roof, or shall be reconnected with a soil or waste vent of proper size.

906.0 Vent Termination.

906.1 Roof Termination. Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than 6 inches (152 mm) above the roof nor less than 1 foot (305 mm) from a vertical surface. ABS and PVC piping exposed to sunlight shall be protected by water based synthetic latex paints.

906.2 Clearance. Each vent shall terminate not less than 10 feet (3048 mm) from, or not less than 3 feet (914 mm) above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet (914 mm) in every direction from a lot line, alley and street excepted.

Exam Questions:

59. How do you determine the size of vent piping?
A. Total length
B. Table 703.2
C. Total number of fixtures connected
D. All listed answers

60. What is the minimum diameter allowed by this code for an individual vent pipe?
A. 1 inch
B. 1 1⁄4 inches
C. 1 1/2 inches
D. 2 inch

61. Vent and branch vent pipes are required to be free from _____.
A. Drops
B. Sags
C. Bows
D. All listed answers

62. Vents less than _____ above the flood-level rim of a fixture are required to be installed with approved drainage fittings, material, and grade to the drain.
A. 6 inches
B. 4 inches
C. 2 inches
D. All listed answers

63. Vent pipes are required to extend undiminished in size above the _____.
A. Receptor
B. Trap
C. Roof
D. Horizontal plane

64. What is the minimum distance a vent can terminate in every direction from a lot line, alley and street excepted?
A. 3 feet
B. 10 feet
C. 5 feet
D. 6 feet

906.3 Use of Roof. Vent pipes shall be extended separately or combined, of full required size, not less than 6 inches (152 mm) above the roof or fire wall. Flagpoling of vents shall be prohibited except where the roof is used for assembly purposes or parking. Vents within 10 feet (3048 mm) of a part of the roof that is used for such other purposes shall extend not less than 7 feet (2134 mm) above such roof and shall be securely stayed.

906.4 Outdoor Installations. Vent pipes for outdoor installations shall extend not less than 10 feet (3048 mm) above the surrounding ground and shall be securely supported.

906.6 Lead. (See Chapter 17) Sheet lead shall be not less than the following:

(1) For safe pans – not less than 4 pounds per square foot (lb/ft2) (19 kg/m2) or 1⁄16 of an inch (1.6 mm) thick.

(2) For flashings or vent terminals – not less than 3 lb/ft2 (15 kg/m2).

(3) Lead bends and lead traps shall be not less than 1⁄8 of an inch (3.2 mm) wall thickness.

906.7 Frost or Snow Closure. Where frost or snow closure is likely to occur in locations having minimum design temperature below 0°F (-17.8°C), vent terminals shall be not less than 2 inches (50 mm) in diameter, but in no event smaller than the required vent pipe. The change in diameter shall be made inside the building not less than 1 foot (305 mm) below the roof in an insulated space and terminate not less than 10 inches (254 mm) above the roof, or in accordance with the Authority Having Jurisdiction.

907.0 Vent Stacks and Relief Vents.

907.1 Drainage Stack. Each drainage stack that extends 10 or more stories shall be served by a parallel vent stack, which shall extend undiminished in size from its upper terminal and connect to the drainage stack at or immediately below the lowest fixture drain. Each such vent stack shall also be connected to the drainage stack

at each fifth floor, counting down from the uppermost fixture drain, by means of a yoke vent, the size of which shall be not less in diameter than either the drainage or the vent stack, whichever is smaller.

907.2 Yoke Vent. The yoke vent connection to the vent stack shall be placed not less than 42 inches (1067 mm) above the floor level, and the yoke vent connection to the drainage stack shall be by means of a wye-branch fitting placed below the lowest drainage branch connection serving that floor.

908.0 Wet Venting.

908.1 Vertical Wet Venting. Wet venting is limited to vertical drainage piping receiving the discharge from the trap arm of one and two fixture unit fixtures that also serves as a vent not exceeding four fixtures. Wet-vented fixtures shall be within the same story; provided, further, that fixtures with a continuous vent discharging into a wet vent shall be within the same story as the wet-vented fixtures. No wet vent shall exceed 6 feet (1829 mm) in developed length.

908.1.1 Size. The vertical piping between two consecutive inlet levels shall be considered a wet-vented section. Each wet-vented section shall be not less than one pipe size exceeding the required minimum waste pipe size of the upper fixture or shall be one pipe size exceeding the required minimum pipe size for the sum of the fixture units served by such wet-vented section, whichever is larger, but in no case less than 2 inches (50 mm).

Exam Questions:

65. What is the minimum height vent pipes are required to extend above a fire wall?
- A. 6 inches
- B. 5 inches
- C. 3 inches
- D. 2 inches

66. A vent pipe used for outdoor installations is required to extend to a minimum height of _____ above the surrounding ground.
- A. 3 feet
- B. 10 feet
- C. 5 feet
- D. 6 feet

67. What is the minimum required thickness for a lead safe pan?
- A. 1⁄4 of an inch
- B. 1⁄8 of an inch
- C. 1⁄16 of an inch
- D. 3⁄16 of an inch

68. What is the minimum required wall thickness for a lead trap?
- A. 1⁄16 of an inch
- B. 1⁄8 of an inch
- C. 1⁄4 of an inch
- D. 3⁄16 of an inch

69. What is the minimum size vent terminal required where frost or snow closure is likely to occur?
- A. 1 1⁄4 inches
- B. 1 inch
- C. 1 1/2 inches
- D. 2 inch

70. What is the allowable maximum developed length for a wet vent?
- A. 3 feet
- B. 10 feet
- C. 5 feet
- D. 6 feet

908.2 Horizontal Wet Venting for a Bathroom Group. A bathroom group located on the same floor level shall be permitted to be vented by a Horizontal wet vent where all the conditions of Section 908.2.1 through Section 908.2.5 are met.

908.2.1 Vent Connection. The dry vent connection to the wet vent shall be an individual vent for the bidet, shower, or bathtub. One or two vented lavatory(s) shall be permitted to serve as a wet vent for a bathroom group. Only one wet-vented fixture drain or trap arm shall discharge upstream of the dry-vented fixture drain connection. Dry vent connections to the horizontal wet vent shall be in accordance with Section 905.2 and Section 905.3

908.2.2 Size. The wet vent shall be sized based on the fixture unit discharge into the wet vent. The wet vent shall be not less than 2 inches (50 mm) in diameter for 4 drainage fixture units (dfu) or less, and not less than 3 inches (80 mm) in diameter for 5 dfu or more. The dry vent shall be sized in accordance with Table 702.1 and Table 703.2 based on the total fixture units discharging into the wet vent.

908.2.3 Trap Arm. The length of the trap arm shall not exceed the limits in Table 1002.2. The trap size shall be in accordance with Section 1003.3. The vent pipe opening from the horizontal wet vent, except for water closets and similar fixtures, shall not be below the weir of the trap.

908.2.5 Additional Fixtures. Additional fixtures shall discharge downstream of the wet vent system and be conventionally vented. Only the fixtures within the bathroom group shall connect to the wet vented horizontal branch.

Exam Questions:

71. What can one or two vented lavatory(s) serve as for a bathroom group?
- A. A common vent
- B. A trap
- C. A wet vent
- D. All listed answers

72. How many wet-vented fixture trap arms can discharge upstream of a dry-vented fixture drain connection?
- A. 1
- B. 2
- C. Unlimited
- D. This type of connection is not allowed

73. What is the minimum required wet vent diameter size for 4 drainage fixture units?
- A. 1 1⁄4 inches
- B. 3 inch
- C. 1 1/2 inches
- D. 2 inch

74. What is the minimum required wet vent diameter size for 5 drainage fixture units?
- A. 1 1⁄4 inches
- B. 3 inch
- C. 1 1/2 inches
- D. 2 inch

75. A dry vent is required to be sized in accordance with what listed table(s)?
- A. 701.2
- B. 702.1
- C. B and D
- D. 703.2

909.0 Special Venting for Island Fixtures.

909.1 General. Traps for island sinks and similar equipment shall be roughed in above the floor and shall be permitted to be vented by extending the vent as high as possible, but not less than the drain-board height and then returning it downward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain. The return vent shall be connected to the horizontal drain through a wye-branch fitting and shall, in addition, be provided with a foot vent taken off the vertical fixture vent by means of a wye branch immediately below the floor and extending to the nearest partition and then through the roof to the open air, or shall be permitted to be connected to other vents at a point not less than 6 inches (152 mm) above the flood-level rim of the fixtures served. Drainage fittings shall be used on the vent below the floor level, and a slope of not less than 1⁄4 inch per foot (20.8 mm/m) back to the drain shall be maintained. The return bend used under the drain-board shall be a one piece fitting or an assembly of a 45 degree (0.79 rad), a 90 degree (1.57 rad), and a 45 degree (0.79 rad) elbow in the order named. Pipe sizing shall be as elsewhere required in this code. The island sink drain, upstream of the returned vent, shall serve no other fixtures. An accessible cleanout shall be installed in the vertical portion of the foot vent.

910.0 Combination Waste and Vent Systems.

910.1 Where Permitted. Combination waste and vent systems shall be permitted where structural conditions preclude the installation of conventional systems as otherwise prescribed by this code.

910.2 Approval. Plans and specifications for each combination waste and vent system shall first be approved by the Authority Having Jurisdiction before a portion of such system is installed.

910.3 Vents. Each combination waste and vent system, as defined in Chapter 2, shall be provided with a vent or vents adequate to ensure free circulation of air. A branch exceeding 15 feet (4572 mm) in length shall be separately vented in an approved manner. The area of a vent installed in a combination waste and vent system shall be not less than one-half the inside cross-sectional area of the drain pipe served. The vent connection shall be downstream of the uppermost fixture.

910.5 Vertical Waste Pipe. No vertical waste pipe shall be used in such a system, except the tailpiece or connection between the outlet of a plumbing fixture and the trap. Such tailpieces or connections shall be as short as possible, and in no case shall exceed 2 feet (610 mm). Exception: Branch lines shall be permitted to have 45 degree (7.9 rad) vertical offsets.

910.4 Size. Each waste pipe and each trap in a combination system shall be not less than two pipe sizes exceeding the sizes required by Chapter 7 of this code, and not less than two pipe sizes exceeding a fixture tailpiece or connection.

910.6 Cleanouts. An accessible cleanout shall be installed in each vent for the combination waste and vent system. Cleanouts shall not be required on a wet-vented branch serving a single trap where the fixture tailpiece or connection is not less than 2 inches (50 mm) in diameter and provides ready access for cleaning through the trap.

Exam Questions:

76. Drainage fittings used with island fixtures are required to maintain a minimum slope of _____ per foot back to its drain.

A. 5/16 inch
B. 1/8 inch
C. 1/16 inch
D. 1⁄4 inch

77. An island sink drain upstream of the returned vent can serve how many additional fixtures?

A. 1
B. 0
C. 4
D. 2

78. Who needs to approve the plans for a combination waste and vent system?

A. Mechanical engineer
B. Authority Having Jurisdiction
C. Structural Engineer
D. All listed answers

79. A combination branch exceeding _____ is required to be separately vented in an approved manner.

A. 15 feet
B. 20 feet
C. 50 feet
D. 10 feet

80. What is the minimum required area for a vent installed in a combination waste and vent system?

A. Three times the inside cross-sectional area of the drain pipe served
B. Twice the inside cross-sectional area of the drain pipe served
C. One-half the inside cross-sectional area of the drain pipe served
D. Two-thirds the inside cross-sectional area of the drain pipe served