

Sample Exam Questions and Recommended References for ABC's Very Small Water System Exam

The following questions are provided as examples of the **types** of questions that will be covered on the ABC standardized Very Small Water System certification exam. You will not find any of these questions duplicated on a certification exam, so don't try to memorize the questions and answers. These sample questions should not be used in place of other training materials and courses. The reference material listed at the end of this document will help you better understand the topics and answer similar questions that may be on the certification exam. ABC's Formula/Conversion Table, which is to be used when solving math questions, is available in the Exam Information section of ABC's web site.

1. What is the term for a physical connection, direct or indirect, which provides an opportunity for nonpotable water to enter a conduit, pipe or receptacle containing potable water?
 - A. Well testing
 - B. Pump injection
 - C. Bell joint clamp
 - D. Cross connection

2. When bringing community water service to a home with a private well, what is the most positive method of preventing a cross connection between the two systems?
 - A. Residential dual check valve
 - B. Reduced pressure zone backflow preventer
 - C. Complete isolation between the two systems using an air gap
 - D. Pressure vacuum breaker in addition to an RPZ

3. After a new water main is installed and pressure tested it should be
 - A. Flushed with clean water for 24 hours and put into service
 - B. Filled with a solution of 25 ppm to 50 ppm free chlorine for at least 24 hours prior to flushing
 - C. Filled with clean water and allowed to sit for 5 days at full pressure before turning the water into the system
 - D. Photographed so that mapping can be avoided until the system is complete

4. Calculate the volume, in gallons, of a tank that is 75 feet long, 20 feet wide, and 10 feet deep.
 - A. 15,000 gallons
 - B. 112,200 gallons
 - C. 150,000 gallons
 - D. 224,400 gallons

5. An empty atmospheric storage tank is 8 feet in diameter and 32 feet high. How long will it take to fill 90% of the tank volume if a pump is discharging a constant 24 gallons per minute into the tank?
 - A. 7 hours 31 minutes
 - B. 8 hours 21 minutes
 - C. 8 hours 23 minutes
 - D. 9 hours 17 minutes

6. Under the requirements of the Safe Drinking Water Act, it is the duty of the water purveyor to deliver potable water of proper quantity only as far as the
 - A. Entry point of the distribution system
 - B. Customer's curb box and service connection
 - C. Consumer's tap inside the home
 - D. Furthest water main blow-off or sampling point

7. Which of the following terms refers to excessive internal pressure, which may be several times the normal operating pressure and can seriously damage hydropneumatic tanks, valves, and the piping network?
 - A. Air charge
 - B. Flow rate pressure
 - C. Water hammer
 - D. Hydraulic charge

8. What is the primary purpose of a preventive maintenance program?
 - A. Increase the use of backup equipment
 - B. Correct equipment breakdowns
 - C. Eliminate inventory of spare parts
 - D. Avoid future equipment problems

9. What are the two most important safety concerns when entering a confined space?
 - A. Corrosive chemicals and falls
 - B. Bad odors and claustrophobia
 - C. Extreme air temperatures and slippery surfaces
 - D. Oxygen deficiency and hazardous gases

10. To ensure that the water supplied by a public water system meets federal and state requirements, the water system operator must regularly collect samples and
 - A. Test the water at the nearest water testing laboratory
 - B. Determine a sampling schedule based on the lab's recommendations
 - C. Send all analysis results to the State periodically
 - D. Count the number of active wells in the system

CORRECT ANSWERS

- | | |
|-----------------------------------|---------------|
| 1. Answer: D | 6. Answer: C |
| 2. Answer: C | 7. Answer: C |
| 3. Answer: B | 8. Answer: D |
| 4. Answer: B (see Solution below) | 9. Answer: D |
| 5. Answer: A (see Solution below) | 10. Answer: C |
-

Solution to question 4:

Volume of Rectangular Tank = (Length) (Width) (Height)

$$75 \text{ ft} \times 20 \text{ ft} \times 10 \text{ ft} = 15,000 \text{ cu ft}$$

Convert the volume to gallons: from the ABC Formula/Conversion Table, 1 cubic foot = 7.48 gallons

$$15,000 \text{ cu ft} \times 7.48 \text{ gal/1 cu ft} = 112,200 \text{ gal}$$

Solution to question 5:

Calculate volume of tank: from the ABC Formula/Conversion Table,

Volume of Cylinder = (0.785) (Diameter²) (Height)

$$0.785 \times 8 \text{ feet} \times 8 \text{ feet} \times 32 \text{ feet} = 1,607.68 \text{ cu ft}$$

Convert the volume to gallons: from the ABC Formula/Conversion Table, 1 cubic foot = 7.48 gallons

$$1,607.68 \text{ cu ft} \times 7.48 \text{ gal/1 cu ft} = 12,025 \text{ gallons}$$

Calculate 90% of the tank volume (as specified in question): 90% = 0.90

$$12,025 \text{ gallons} \times 0.90 = 10,823 \text{ gallons}$$

Calculate the time required to discharge that volume at the given rate:

$$10,823 \text{ gallons} \times (1 \text{ minute}/24 \text{ gallons}) = 451 \text{ minutes}$$

Since there are 60 minutes in 1 hour, 451 minutes = 7 hours 31 minutes

REFERENCE MATERIAL

ABC Very Small Water System exam questions are referenced to the following manuals. This list of references is recommended to help individuals prepare for an ABC Very Small Water System exam.

American Water works Association (AWWA)

- *Water Transmission and Distribution*
- *Water Quality*
- *Basic Science Concepts and Applications*
- *Water Distribution Operator Training Handbook*
- *Water System Security, A Field Guide*

To order, contact: American Water Works Association
6666 West Quincy Ave.
Denver, CO 80235

Web site: www.awwa.org
Phone: (800) 926-7337
Fax: (303) 347-0804
E-mail: custsvc@awwa.org

California State University, Sacramento (CSUS) Foundation, Office of Water Programs

- *Water Distribution System Operation and Maintenance*
- *Small Water System Operation and Maintenance*
- *Utility Management*
- *Manage for Success*

To order, contact: Office of Water Programs
California State University, Sacramento
6000 J Street
Sacramento, CA 95819-6025

Web site: www.owp.csus.edu
Phone: (916) 278-6142
Fax: (916) 278-5959
E-mail: wateroffice@owp.csus.edu

Regulations

For United States exams:

- *Code of Federal Regulations*, Title 40, Part 141 (www.gpo.gov)
- State regulations (contact information for state certification programs is available on the Certification Contacts page of ABC's web site, www.abccert.org)

For Canadian exams:

- *Guidelines for Canadian Drinking Water Quality*. Federal-Provincial-Territorial Subcommittee on Drinking Water. Ottawa, ON: Health Canada (www.hc-sc.gc.ca/waterquality)
- Provincial and territorial regulations (contact information for provincial/territorial certification programs is available on the Certification Contacts page of ABC's web site, www.abccert.org)