DW Module 8:
Distribution Systems
Answer Key

[Determine the answers to the three calculations in the workbook, using Figure 1.20 Remember that the formula and sample calculations were given on page 1-15, covered a few minutes earlier.]

Calculation 1.1 – What is the HGL at point A?

Ans: 640' (Ground Elevation + 150' - 10')

Calculation 1.2 – What is the Pressure at point A?

Ans: HGL, ft. = Head, ft. + centerline elevation of pipe, ft. Thus,

Head at point A = HGL at point A - Centerline Elevation of Pipe at point A
= 640' - (500'+75')
= 65'

Pressure at point A = 65÷2.31
= 28 psi

Calculation 1.3 – What is the energy loss between tank 1 and tank 2?

Ans: Energy Loss = HGL at Tank 1 - HGL at Tank 2
= 25' (10.82 psi)

UNIT 1 EXERCISE:

1. Components of a distribution network include:

Ans: a. Pumps
c. Storage Facilities
f. Pipes
g. Hydrants

h. Valves

j. Meters

2. List the five programs involved in routine maintenance of distribution networks.

Ans: Pump Maintenance, Valve Maintenance, Meter Testing and Maintenance, Fire Hydrant Maintenance, and Inspection and Monitoring.

3. List the three key components of a pipeline maintenance program.

Ans: Leak Detection, Main Break Repair and Replacement, and Cleaning and Lining.

4. Distribution storage tanks help offset system demand fluctuations.

a. True b. False

5. Dry barrel hydrants are never used in Pennsylvania.

a. True b. False

Unit 2 Exercise

1. List the three primary functions of distribution storage facilities.

a. __equalize system demands and pressures_____

b. __provide fire protection_____

c. __provide emergency stores of water_____

2. What are some advantages to using an elevated storage tank?

To provide water pressure or head.

To maximize the ratio of useable storage volume to total storage volume.

3. Explain the procedures and methods used in controlling the filling and draining of a distribution storage facility that you are familiar with.

Answers may vary.

4. List three maintenance issues concerning distribution storage facilities.

a. ____Painting_____

b. ____Corrosion_____

c. ____Detention time_____

5. Storage facilities can be classified as clear wells, elevated, ground level and hydropneumatic.

UNIT 3 EXERCISE: 10 minutes

[Once the required time has passed review the answers].

1. Write the three types of distribution system water quality issues below.

Ans: Chemical
Biological
Aesthetic

2. Select the best response to complete the following true statement. Disinfection and chlorine residual in a distribution system are used to:

Ans: d. Inactivate bacteria.

3. The initial chlorine demand of the impurities in a source of water is 1.5 mg/l. What is the chlorine dosage required to produce a chlorine residual of 2.0 mg/l?

Ans: Chlorine dosage = Chlorine Demand + Desired Chlorine Residual
= 3.5 mg/l

4. What is the recommended minimum water velocity when flushing water distribution piping?

Ans: 2.5 feet per second for 30 minutes.

5. List five practices to enhance distribution system water quality.

Ans: Distribution Flushing
Cross Connection Control
Water Main Cleaning and Lining
Minimization of Dead-ends and residence time
Corrosion Control
Chlorine Booster Facilities
Proper Storage Facility Operations