

Name \_\_\_\_\_  
Date \_\_\_\_\_

**TDP-502**  
**Water Piping and Pumps**

1. Briefly describe each of the following piping systems:

Closed-Loop: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Open Recirculating Loop: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Once-Thru: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. In commercial buildings, what two water distribution designs should be considered and why?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Explain the difference between direct and reverse return systems.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. What is the purpose of a strainer and why is it important to use a strainer in open-loop and once-thru systems?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. List two functions of expansion tanks:

- a) \_\_\_\_\_
- b) \_\_\_\_\_

6. List two hydronics accessories that are used to remove unwanted air from closed-loop piping systems.

- a) \_\_\_\_\_
- b) \_\_\_\_\_

7. Explain why air removal is necessary in closed-loop piping systems.

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8. For pipe sizing purposes, what is the typical water velocity range for the following:

Mains and Risers: \_\_\_\_\_

Branches and Runouts: \_\_\_\_\_

9. Why does the friction loss chart for open-loop piping systems differ from closed-loop?

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10. List five types of centrifugal pumps used in water piping systems in ascending order of size and first cost:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_