

Final Exam

Lift Station Design

1. Which is NOT a purpose or function of a lift station?
 - ☐ a. To move wastewater to the destination
 - ☐ b. To receive and store wastewater from gravity sewer pipes
 - ☐ c. To recirculate wastewater
2. What is the main benefit to using lift stations rather than only gravity sewers?
 - ☐ a. To allow shallow pipes of smaller diameter
 - ☐ b. To avoid odor issues
 - ☐ c. To reduce energy consumption
3. Which lift station location will likely have the greatest discharge pressure?
 - ☐ a. Nearest to the regional pump station
 - ☐ b. Furthest from the regional pump station
 - ☐ c. Neither, all locations will have the same pressure
4. What is a common industry standard for the design of wastewater facilities?
 - ☐ a. Ten States Standards
 - ☐ b. NFPA 820
 - ☐ c. AWWA Standard E103
5. Which of the following is NOT a step for lift station design?
 - ☐ a. Intake design
 - ☐ b. Headworks design
 - ☐ c. Pump selection
6. What do you call the design flow that includes potential future developments?
 - ☐ a. Average design flow
 - ☐ b. Ultimate design flow
 - ☐ c. Peak design flow
7. Which are methods for measuring flow rates on an existing lift station?
 - ☐ a. Install a flow meter, use consumption data, or use pump run times
 - ☐ b. Install a flow meter, use pipe diameter, or use pump run times
 - ☐ c. Install a flow meter, use consumption data, or use fiber optic cable.
8. Which type of lift station is most common for collection systems?
 - ☐ a. Suction Lift Station
 - ☐ b. Vacuum Sewer Station
 - ☐ c. Submersible lift station

9. Which is NOT an advantage of a submersible lift station?
- ☐ a. Less expensive
 - ☐ b. Can have indoor facilities
 - ☐ c. Simple design
10. Which is NOT another name for a separate pump room?
- ☐ a. Clean room
 - ☐ b. Dry well
 - ☐ c. Dry pit
11. Which is an option for pulling a lift?
- ☐ a. Check valve
 - ☐ b. Blower
 - ☐ c. Self-priming pump
12. What are the advantages of a vertical lift station?
- ☐ a. Can remove without a crane
 - ☐ b. Energy efficiency and flow stability
 - ☐ c. Pump access without exposure to wastewater
13. Which are main components of a vacuum lift station?
- ☐ a. Collection sump, vacuum valve, vacuum tank
 - ☐ b. Collection sump, plug valve, vacuum tank
 - ☐ c. Collection sump, vacuum valve, vacuum truck
14. When are three or more pumps beneficial?
- ☐ a. Large flows, large peak factor, large pressure range
 - ☐ b. Small flows, large peak factor, large pressure range
 - ☐ c. Large flows, large peak factor, small pressure range
15. Which are the benefits to variable speed control?
- ☐ a. May allow fewer pumps, less power use, and a no wet well.
 - ☐ b. May allow fewer pumps, less power use, and a smaller wet well.
 - ☐ c. May allow no stand-by pump, less power use, and a smaller wet well.
16. What is the recommended minimum floor slope in a wet well per the Ten States Standards?
- ☐ a. 1 to 1
 - ☐ b. 0.5 to 1
 - ☐ c. 0.25 to 1
17. What is the basis for calculating the MINIMUM wet well volume?
- ☐ a. Maintaining pump efficiency
 - ☐ b. Preventing air entrainment
 - ☐ c. Preventing excessive pump cycling
18. What is the basis for calculating a MAXIMUM wet well volume?
- ☐ a. Preventing septic conditions
 - ☐ b. Controlling construction costs
 - ☐ c. Controlling buoyancy
19. What is the recommended force main velocity per the Ten States Standards?

- ☐ a. 2 to 6 fps
- ☐ b. 2 to 8 fps
- ☐ c. 4 to 8 fps

20. Which condition results in the lowest static head?

- ☐ a. LOW water level in the wet well and LOW force main pressure
- ☐ b. HIGH water level in the wet well and HIGH force main pressure
- ☐ c. HIGH water level in the wet well and LOW force main pressure

21. The TDH is the sum of what three losses?

- ☐ a. minor, pipe friction, and static
- ☐ b. minor, major, and static
- ☐ c. minor, dynamic, and static

22. Which types of pumps can handle rags?

- ☐ a. chopper, screw, and self-cleaning
- ☐ b. reducer, screw, and self-cleaning
- ☐ c. chopper, screw, and self-priming

23. Where should the BEP be located?

- ☐ a. To the right of the low head curve
- ☐ b. Between the high head and low head curves
- ☐ c. To the left of the high head curve

24. What can be done if the NPSHr is greater than NPSHa?

- ☐ a. No change is needed
- ☐ b. Increase the wet well diameter
- ☐ c. Increase the inlet submergence

25. Which is NOT an option for reading water level?

- ☐ a. Buoys
- ☐ b. Bubbler
- ☐ c. Ultrasonic sensor
- ☐ d. Several floats