

Final Exam
Continuing Education Course #512
Vertical Pump Selection

1. Which kind of impeller is LEAST common for vertical pumps?
 - ☐ a. Axial flow
 - ☐ b. Mixed flow
 - ☐ c. Radial flow
2. Which kind of impeller performs well for high flow, low pressure applications?
 - ☐ a. Axial flow
 - ☐ b. Mixed flow
 - ☐ c. Radial flow
3. Which is a common advantage for vertical pumps?
 - ☐ a. Easy access to impeller
 - ☐ b. Smaller footprint
 - ☐ c. Shallow excavation
4. Which is the most common guide for vertical pump design?
 - ☐ a. WP Design Procedures
 - ☐ b. VP Basics
 - ☐ c. HI Standards
5. What is unique about a vertical submersible pump (VS0)?
 - ☐ a. Impeller above the motor
 - ☐ b. Mixed flow impeller
 - ☐ c. Multi-stage
6. What is the main difference between a vertical turbine (VS1) and axial flow (VS3) pump?
 - ☐ a. Motor mounting
 - ☐ b. Impeller type
 - ☐ c. Inlet bell
7. What is the main difference between a vertical sump (VS4) and cantilever (VS5) pump?
 - ☐ a. No bottom bearing
 - ☐ b. Separate riser pipe
 - ☐ c. Vertical discharge
8. For VS6 pumps, what is NOT another name for the outer casing?
 - ☐ a. Can
 - ☐ b. Barrel
 - ☐ c. Bell

9. Which type of pump is common for in-boosting and high pressure?
- ☐ a. VS8 Vertical Multistage
 - ☐ b. VS2 Double Suction
 - ☐ c. VS4 Vertical Sump
10. Which is NOT an example of design criteria?
- ☐ a. Peak flow of 450 gpm
 - ☐ b. Disinfect before commissioning
 - ☐ c. Minimum efficiency of 75%
11. Which describes the firm capacity of a pump station?
- ☐ a. Flow with all pumps running
 - ☐ b. Flow with all pumps running except one small pump
 - ☐ c. Flow with all pumps running except one large pump
12. Which pump arrangement is best for maintaining a fixed water level?
- ☐ a. Simplex
 - ☐ b. Duplex
 - ☐ c. Triplex
13. Can adding VFDs reduce the required wet well storage volume?
- ☐ a. Yes
 - ☐ b. No
14. What is the normal order for creating flow diagrams?
- ☐ a. PFD, BFD, P&ID
 - ☐ b. BFD, PFD, P&ID
 - ☐ c. PFD, P&ID, BFD
15. Which is NOT a common wet well arrangement?
- ☐ a. Trench
 - ☐ b. Rectangular
 - ☐ c. Circular
 - ☐ d. Triangle
16. How does minimum submergence protect a pump?
- ☐ a. Prevents air intake
 - ☐ b. Prevents excessive cycling
 - ☐ c. Prevents motor overload
17. What does NPSHr stand for?
- ☐ a. net positive suction head realized
 - ☐ b. net positive suction head required
 - ☐ c. net pump suction head required
18. Which is NOT another word for TDH?
- ☐ a. Loss
 - ☐ b. Head
 - ☐ c. Static
19. Which system curve usually has the key design point for pump selection?

- ☐ a. High head curve
 - ☐ b. Low head curve
20. What does the K-value method help calculate?
- ☐ a. Minor losses
 - ☐ b. Major losses
 - ☐ c. Friction losses
21. What is common friction coefficient for PVC pipe?
- ☐ a. 100
 - ☐ b. 120
 - ☐ c. 150
22. For hydraulic calculations with multiple duty pumps of the same size, what flow should be used for each pump branch?
- ☐ a. Design flow divided by total number of pumps
 - ☐ b. Design flow divided by number of duty pumps
 - ☐ c. Design flow
23. Which may justify iterative calculations?
- ☐ a. Pumps are different sizes
 - ☐ b. More than two pumps
 - ☐ c. One fitting is different in the pump branches
24. Which chart can help identify one or more pump models for the flow and TDH?
- ☐ a. System curves
 - ☐ b. Chart of capacity ranges
 - ☐ c. Power curve
25. After plotting a pump curve with low and high head system curves, where should the BEP be located?
- ☐ a. To the left of high head system curve
 - ☐ b. To the right of low head system curve
 - ☐ c. Between system curves
26. For two equal pumps in parallel, how is a combined pump curve created?
- ☐ a. Double pump flow rate for each TDH value.
 - ☐ b. Double pump TDH for each flow rate value.
 - ☐ c. Square the pump flow rate for each TDH value.
27. What can Affinity Laws help create?
- ☐ a. System curves at different conditions
 - ☐ b. Pump curves at different speeds
 - ☐ c. NPSHr curves
28. What does a power curve helps size?
- ☐ a. Impeller
 - ☐ b. Column
 - ☐ c. Motor
29. Which pump condition is at zero flow?
- ☐ a. BEP
 - ☐ b. Run-out

☐ c. Stall

30. Which operating condition results in the greater flow?

☐ a. Low head system curve intersection

☐ b. High head system curve intersection