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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 help 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

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