# Final Exam
Continuing Education Course #480
Chemical Feed System Design

1. What is the purpose of a chemical feed system?
- a. Mix chemicals
- b. Inject a chemical solution into a destination
- c. Storage of chemicals

2. Which is NOT a typical component of a chemical feed system?
- a. Unloading station
- b. Feed pumps
- c. Disinfection

3. Which is an OSHA standard?
- a. 29 CFR 1910
- b. 40 CFR 450
- c. UBC 2022

4. Which is entited "Uniform Fire Code"?
- a. NFPA 400
- b. UBC 1
- c. NFPA 1

5. What is another name for a NFPA Fire Rating Label?
- a. Hazard Box
- b. MSDS
- c. Fire Diamond

6. SDS stands for what?
- a. Safety Data Sheet
- b. Safety Distance Setting
- c. Shower Down Section

7. Which is the preferred order for design steps?
- a. Design criteria, P&ID, arrangement,
- b. Design criteria, arrangement, PFD
- c. Design criteria, PFD, arrangement

8. Which is NOT a design criteria?
- a. 10% contingency
- b. Provide 30 days of storage
- c. Materials compatible with sodium hydroxide

9. Which is the highest design flow to be maintained by the pumping system?
- a. Big design flow
- b. Maximum design flow
- c. Peak design flow

10. Which is NOT a unit to express chemical dosage?
- a. Volumetric ppm
- b. Solids ppm
- c. Liquid weight ppm

11. Which is NOT a benefit of a day tank?
- a. Comply with regulations
- b. Prevent overfeeding
- c. Storage of noncompliant fluid

12. Which is a benefit of a duplex pump arrangement versus a triplex arrangement?
- a. Simple design
- b. Covers a greater range of flows
- c. Covers a greater range of pressures

13. What is a process flow diagram?
- a. Section view with hydraulic grade line
- b. Instrumentation diagram
- c. Schematic showing major components and piping

14. What is another name for chemical storage tanks?
- a. Bulk tanks
- b. Belly tanks
- c. Tiger tanks

15. Which is NOT a type of tank mixing system?
- a. Jet mix
- b. Stand mixer
- c. Side entry mixer

16. How does a positive displacement pump move fluid?
- a. Spinning impeller
- b. Chambers that fill and empty
- c. Pressure swings

17. What are the two main categories of positive displacement pumps?
- a. Centrifugal & Rotary
- b. Reciprocating & Vertical
- c. Reciprocating & Rotary

18. What is the most common type of chemical feed pump?
- a. Diaphragm
- b. Circumferential piston
- c. Progressive cavity

19. Which is NOT a diaphragm pump configuration?

- a. Side entry
- b. Solenoid driven
- c. Hydraulic

20. How does a peristaltic pump move fluid?
- a. Squeezing a flexible tube while rotating
- b. Rotors rotating in opposite directions
- c. Rotating gears creating chambers

21. What flows are common for a peristaltic pump?
- a. High
- b. Medium
- c. Low

22. Which is not a configuration for a peristaltic pump?
- a. Hose
- b. Pipe
- c. Tube

23. How does a gear pump move fluid?
- a. Squeezing a flexible tube while rotating
- b. Lobed rotors rotating in opposite directions
- c. Two rotating gears creating chambers

24. Which is NOT a method for flow control with a reciprocating pump?
- a. Stroke speed
- b. Tube speed
- c. Stroke length

25. What is a common turndown ratio for a metering pump?
- a. 0.5:1
- b. 100:1
- c. 10,000:1

26. What is the formula for flow control for a reciprocating pump?
- a. Pump Flow = Max Pump Flow * % Speed/100 * % Stroke/100
- b. Pump Flow = Peak flow * % Speed / 2
- c. Pump Flow = Max Pump Flow * % Speed * % Stroke / 2

27. In general, which can pull a greater lift?
- a. Centrifugal pump
- b. Positive displacement pump
- c. Vertical pump

28. Which should be larger: NPSHr or NPSHa?
- a. NPSHa
- b. NPSHr
- c. Should be equal

29. Which formula represents TDH?
- a. TDH = minor losses + major losses + static
- b. TDH = minor losses + pipe friction + static

○ c. TDH = minor losses + dynamic losses + static

30. What does a pulsation dampener do?
○ a. Moistens the pump head
○ b. Sends pulse control signals
○ c. Reduces pressure fluctuations