HYDRALICS and PNEUMATIC PUZZLES

1. Pascal's law states that pressure in a confined body of fluid will act_____in all directions.

- A. erratically
- B. equally
- C. forward
- D. sequentially

2. Pressure in a hydraulic system is generated by _____ to flow.

- A. acceptance
- B. immunity
- C. resistance
- D. compliance

3. Force = _____ x _____

- A. flow x distance
- B. work x time
- C. pressure x flow
- D. pressure x area

4. Most of the energy not used to move the load in a hydraulic system turns into_____.

- A. heat
- B. light
- C. potential
- D. excrement

5. The relief valve is a normally closed valve. The term "closed" means that in the power off condition the valve is:

- A. open to flow
- B. closed to flow
- C. adjustable
- D. non-adjustable

6. When the compensator setting of a pressure compensating hydraulic pump is reached the pump volume will:

- A. dump back to tank through the relief valve

- B. dump back to tank through the compensator
- C. be reduced to only what the system needs
- D. be reduced until the pressure drops to near 0

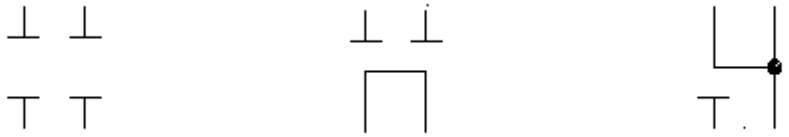
7. What is the number one reason why pumps cavitate?

- A. low fluid level
- B. air leak in the suction line
- C. plugged suction strainer
- D. electric motor driving at an RPM that is too low

8. What five characteristics does the valve below have?

- A. Normally open, 4-way, 2 position, detent, hydraulically actuated
- B. Normally open, two-way, three position, spring return, solenoid actuated
- C. Normally closed, two position, two-way, spring return, solenoid actuated
- D. Normally open, two position, two-way, spring return, hydraulically actuated

9. Which valve center position would be best to use with a fixed displacement pump?



A B C

- A
- B
- C
- D. All of the choices would work equally well

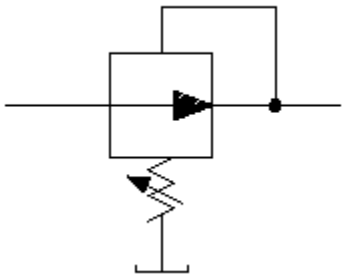
10. Which of the valve actuators indicates a larger valve?

A B

- A

- B
- C. Both valves are the same size
- D. Either valve could be larger

11. The pressure reducing valve shown below is:



- A. normally open
- B. normally closed
- C. non-adjustable
- D. solenoid actuated

12. What type gas should normally be used to charge an accumulator?

- A. Oxygen
- B. Compressed air
- C. Nitrogen
- D. Acetylene

13. In precharging an accumulator used for volume, if there are no designer recommendations a good setting for most systems is

- A. the same as the compensator setting
- B. the same as the relief valve setting
- C. one half the maximum system pressure
- D. 10% above the maximum system pressure

14. When using a hydraulic accumulator for volume and the accumulator is operating properly, heat should be felt:

- A. all over the accumulator shell
- B. in the lower 1/2-2/3 of the shell
- C. at the bottom of the shell only
- D. at the dump valve only

15. When using an accumulator for shock it should be:

A. installed as far as possible away from the component it protects

B. pre-charged approximately 1000 PSI above the maximum system working pressure

C. one gallon or smaller in size

D. mounted horizontally

16. The symbol shown below indicates:

A. a remotely mounted flow control

B. a fixed orifice flow control

C. a pressure compensating, variable orifice flow control

D. a temperature and pressure compensated variable flow control

17. A purpose of the crossport relief valve in a hydraulic motor circuit is to:

A. absorb shock when a hydraulic motor is first started

B. heat up the hydraulic oil

C. limit the maximum flow to the motor

D. to serve as a back up in case the pump compensator fails

18. Servo and proportional valves operate from a:

A. fixed frequency anolog tone

B. variable DC voltage or mA signal

C. fixed DC voltage

D. fixed AC voltage

19. A servo valve should be nulled:

A. with the signal cable connected

B. with the maximum command signal applied

C. with the signal cable disconnected

D. with the hydraulic pump turned off

20. The purpose of a Temposonic transducer is:

A. to electronically indicate the cylinder position to the PLC

B. to send a variable DC voltage to the servo valve coil

C. to convert a fixed AC voltage to a variable DC voltage

D. to cool the oil in the linear positioner

21. When a problem exists with a linear positioner circuit, the first thing you would do is to:

- A. change the servo or proportional valve
- B. change the Temposonic transducer
- C. increase the system pressure
- D. drive the servo or proportional valve with a test box

22. What is the most reliable indication of a faulty variable displacement hydraulic pump?
- A. Low system pressure
- B. Low oil temperature
- C. Excessive case drain flow
- D. A steady high-pitched whining sound

23. What determines the speed of a hydraulic cylinder or a motor?
- A. System pressure
- B. Amount of oil flow
- C. Weight of the load
- D. Directional valve center position

24. Which of the following applications would require a non bypassing type filter?
- A. Return line filter
- B. Downstream of any fixed displacement pump
- C. Upstream of a servo valve
- D. In a separate filtering and cooling circuit

25. To prevent seal leakage, the case drain line of a hydraulic motor should:
- A. be connected to a system return line
- B. be plugged
- C. run directly back to the tank
- D. none of the above