FINAL EXAM
MF145 Basic Fluid Power

NAME: _____

1. Equal pressure on both sides of a standard cylinder will _____.
   a. do nothing
   b. cause the cylinder to extend
   c. cause the cylinder to retract
   d. cause piston leakage

2. Pressure gauge units are typically psi and _____.
   a. Pa
   b. kPa
   c. 100xkPa
   d. 1000xkPa

3. What is the formula for calculating the force created by hydraulic pressure?
   a. F = P/A
   b. F = A/P
   c. F = A x P
   d. F = 3.1416(R^2)/4 x P

4. Why do hydraulic systems react more responsively than pneumatic systems?
   a. They don't – both are considered fluids and react the same.
   b. Oil is incompressible.
   c. Air is incompressible.
   d. Oil is heavier than air.

5. For a 4/3 DCV, the 4 represents "4-way". That means _____.
   a. There are four spool positions
   b. The outside casing is a #4 size
   c. There are four active ports
   d. There are four spool locations

6. Which of these is a flow rate?
   a. Gallons/Foot
   b. PSI
   c. Inches/second
   d. Liters/minute

7. What is does the following symbol represent?

   a. Pneumatic pump
   b. Flow meter
   c. Hydraulic pump
   d. Hydraulic motor

8. For what reason might you select a unidirectional hydraulic motor?
   a. Cost
   b. Flexibility
   c. Size limitation
   d. Flow speed

9. Inline, bent axis and radial are all types of _____.
   a. Gear motors
   b. Flow meters
   c. DCV's
   d. Piston motors

10. Calculate the extending force of the following cylinder.

    Pressure = 300 psi

    Piston diameter = 3"

    Rod diameter = 0.5"

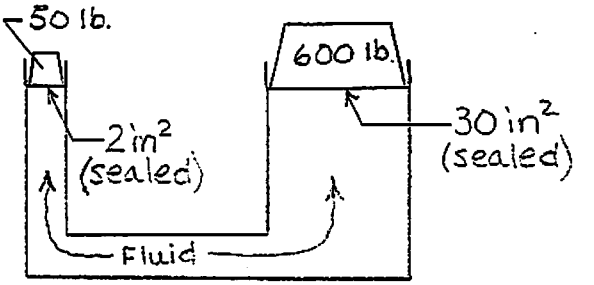
    Rod length = 4"

    pi = 3.1416

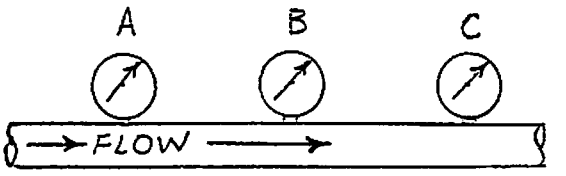
    Area = 3.1416 $D^2/4$ = 3.1416 r^2

   a. 3131 lb
   b. 2453 lb
   c. 2121 lb
   d. 59 lb

11. What will happen in the apparatus shown here?
   a. It will remain in balance.
   b. The 50 lb weight will sink.
   c. The 600 lb weight will sink.
   d. Both weights will sink.

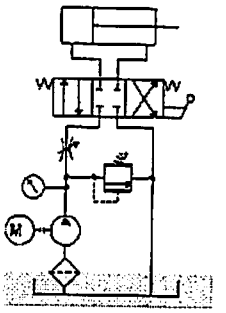


12. From highest to lowest, put the pressure gauge readings in order:
   a. CBA
   b. BAC
   c. ABC
   d. They will all be the same.



13. During operation, the highest pressure in a hydraulic system occurs at _____.
    a. The input of the actuator
    b. The reservoir
    c. The DCV
    d. The pump's outlet

14. What will happen when this DCV's handle is pulled out?

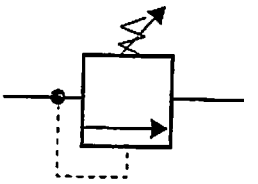


    a. Nothing
    b. Cylinder extends
    c. Cylinder retracts
    d. Port A is blocked

15. Which statement is true?
    a. $P_{abs} = P_{gauge} + P_{atm}$
    b. $P_{abs} = P_{gauge} - P_{atm}$
    c. $P_{atm} = P_{gauge} - P_{abs}$
    d. $P_{atm} = P_{abs} + P_{gauge}$

16. The minimum pressure needed to open a relief valve is called:
    a. Feathering point
    b. Relief point
    c. Cracking pressure
    d. Drainage pressure

17. This valve diagram indicates that _____.



    a. It is normally open
    b. It is normally closed
    c. It is not adjustable
    d. Its movable member is a poppet

18. During normal operation, a relief valve will limit system pressure whenever _____.
    a. The DCV is in a blocked position
    b. The cylinder becomes fully extended
    c. The actuator is stalled by an excessive load
    d. All of these.

19. How can you prevent 'losing the prime of a pump'?
    a. Lower the cracking pressure of the relief valve.
    b. Install a check valve in the suction line.
    c. Use a piston pump.
    d. Increase the diameter of the suction line.

20. Which type of hydraulic check valve does not have a spring?
    a. Ball
    b. Poppet
    c. Swing
    d. None of these.

21. A flow control valve combines a _____ and a _____ in one body. (Pick 2)
    a. Needle valve
    b. Relief valve
    c. Sequence valve
    d. Check valve

22. Which method prevents 'runaway' with an aiding load?
    a. Meter-in
    b. Meter-out
    c. Both a & b are at risk.
    d. Both a & b work equally well.

23. In order to limit damage to a delicate part while it is being clamped by a cylinder, what type of valve could you put in line with the cap end?
    a. Flow control valve
    b. Integral check valve
    c. Check valve
    d. Pressure reducing valve

24. Closed center, tandem center, free float center & open center are types of _____.
    a. Sequence valves
    b. PRVs
    c. DCV spools
    d. Check valves

25. A meter-in flow control valve controls the speed of an actuator by _____.
    a. Restricting the flow to the actuator
    b. Restricting the flow from the actuator
    c. Applying back pressure to the actuator
    d. Diverting flow to the reservoir

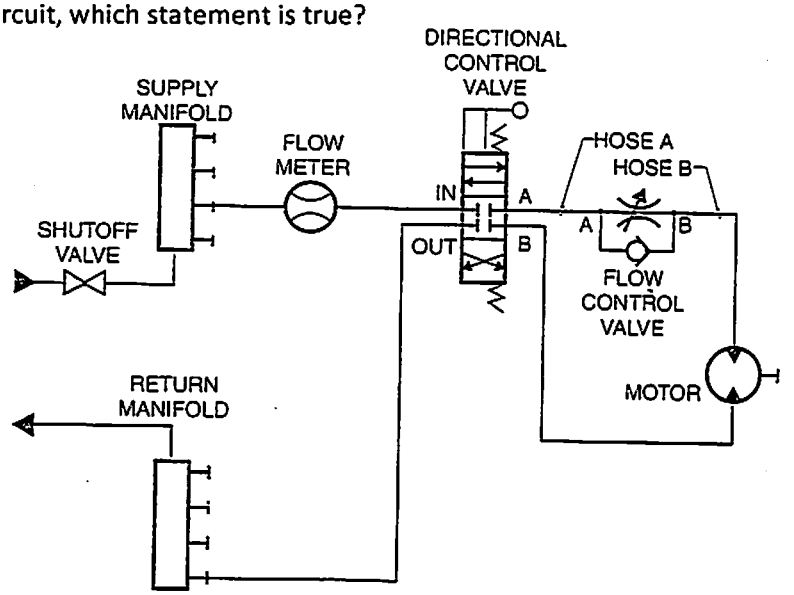
26. The primary purpose of a relief valve is to _____.
    a. Hold pump prime
    b. Control flow
    c. Allow hydraulic motors to coast to a stop
    d. Limit system pressure

27. The rod side area that produces the pull force on a double-acting cylinder is called the _____ area.
    a. Annular
    b. Cap
    c. Rod
    d. Blind

28. Pressure is created by the _____.
    a. Pump
    b. Reservoir
    c. Flow meter
    d. Resistance to flow

29. As oil is pumped through a hydraulic system, it progressively _____.
    a. Drops in pressure
    b. Drops in flow rate
    c. Increases in pressure
    d. Increases in flow rate

30. In this hydraulic circuit, which statement is true?



    a. The motor will stop when the DCV is pulled out.
    b. The motor speed is controllable in both directions.
    c. Motor speed is controlled when the DCV is pulled out.
    d. The motor always runs at full speed when the DCV is pulled out.

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