

MCT336
100 Pts.

Test 2
10/15/02

Name

1. What do we call the general group of components that include, among others, counterbalance, sequence, pressure relief, and unloading valves?

2. What is a “tandem pump” and how is it typically used?

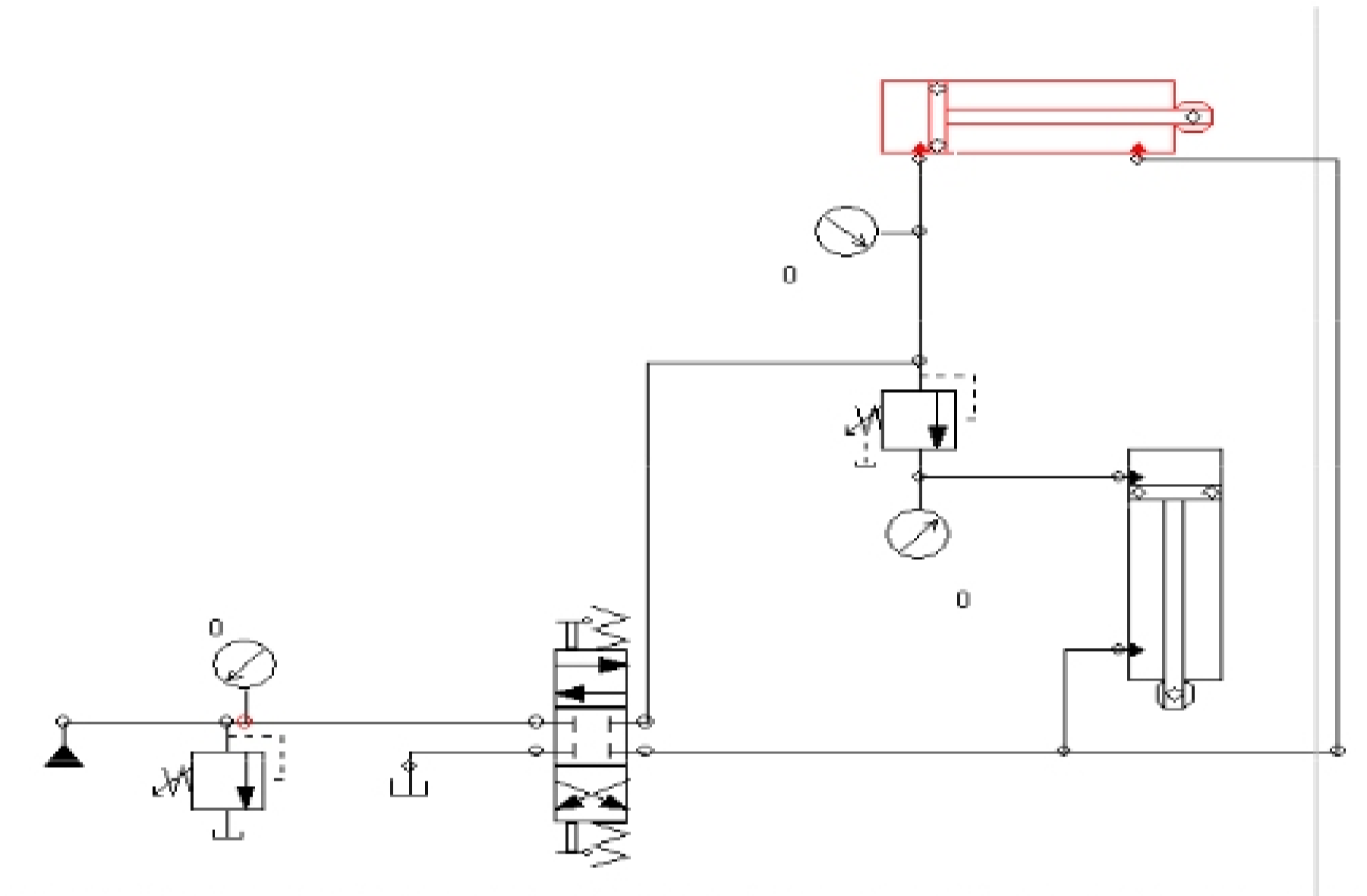
3. If we want two hydraulic cylinders to extend at the same time, should they be plumbed in series or in parallel? Sketch and explain.

4. In some applications an unloading valve is used to reduce the energy requirements of a system. Do these systems use a pressure relief valve also? Why or why not? Explain.

5. What valve is used to keep a load from “running ahead of the oil supply?” Name the valve and explain a typical application and how the valve works.

6. Sketch a power unit that has a filter on the inlet line with a bypass. What is the function of the bypass? What advantages/disadvantages are associated with the bypass?

7. A hydraulic cylinder extension is used to push an ingot through a rolling mill. The working pressure in the cylinder is 850 psi and the piston moves at a rate of 45 ft/min. If the piston bore is 4 inches, the rod is 1 inch, and the stroke is 36 inches, determine:
- 1) The fluid hp:
 - 2) The mechanical hp showing all units:
 - 3) The pushing force:
 - 4) The time for extension:
 - 5) The gpm into the cylinder during extension:
 - 6) The gpm out of the cylinder during extension, if any:
8. You are selecting a positive displacement pump for a given system that must put out 25 gpm at 3000 psi for the actuators to function properly. If it is to run at 1800 RPM, what cir is required? State whether your answer is a minimum or maximum value and what "cir" really means.
9. Determine the efficiency of a hydraulic motor that requires 14 gpm of oil at 750 psi to pull $\frac{3}{4}$ " steel cable at 160 ft/min with a tension of 380#. Is this possible/reasonable?



10. In the above circuit, what is the type of valve is #1 and what is its purpose exactly in this case?
11. Which of the two cylinders will retract first?
12. The top cylinder has an extension resistance equivalent to 900 psi, and the system pressure is limited to 2000 psi. After the top cylinder is fully extended, what will each of the pressure gages read?
P1=
P2=
P3=