



Closed Book Examination. Assume any Missing Data.

Answer the Following Questions:

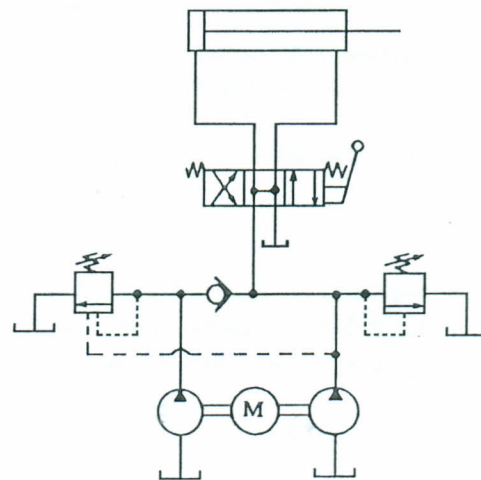
- (1) (a) Name 8 properties that a hydraulic fluid should possess. [3 Marks]  
 (b) List the important factors to be considered when selecting a reservoir. [2 Marks]  
 (c) What is the difference between oxidation, rust and corrosion? [2 Marks]  
 (d) How does a filter differ from a strainer? [3 Marks]

- (2) (a) What is a gerotor pump, and how does it work? [3 Marks]  
 (b) Name the two basic types of piston pumps. Explain with neat sketches one of them. [3 Marks]  
 (c) Compare between the unbalanced and balanced vane motors. Show the construction of each. [3 Marks]  
 (d) Explain motor cavitation and how you can prevent it in unidirectional and bi-directional motor circuits. [3 Marks]

- (3) (a) Sketch the sequencing circuit and list its purpose. [3 Marks]

- (b) A high-low (double pumps) circuit is shown.

- (i) Correct the errors (if any) in the circuit shown.  
 (ii) What are the main components of the circuit?  
 (iii) What types of hydraulic valves are used in the circuit?



[5 Marks]

P.T.O.

- (4) (a) What is a hydrostatic transmission? Name four advantages it typically possesses. [3 Marks]
- (b) What is a limited rotation hydraulic actuator? How does it differ from a hydraulic motor? [2 Marks]
- (c) How are single-acting cylinders retracted? [2 Marks]
- (d) Sketch three fluid power applications for each of the linear and limited rotation actuators. [3 Marks]
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- (5) (a) Why are the pilot-operated relief valves generally preferred over the direct acting relief valves? [3 Marks]
- (b) Compare between pressure relief valve and pressure reducing valve. Draw the construction and symbol of each valve. [4 Marks]
- (c) Describe the purpose, construction, and operation of brake valve. [3 Marks]
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- (6) (a) How does a pilot operated check valve differ from a simple check valve? [2 Marks]
- (b) Compare between using the pilot-operated check valve and counterbalance valve to lock the loads in place. [2 Marks]
- (c) List the purpose of each of the following valves and sketch **one** of them and its hydraulic symbol:  
Nonpressure compensated flow control valve – Pressure compensated flow control valve. [3 Marks]
- (d) List the three ways to use flow control valves to control actuator speed. [3 Marks]
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*Good Luck, B. DJEBEDJIAN*