

# **Level 3 Diploma in Land-based Engineering Operations (0059-3)**

## **Unit 309 Assignment**

### **Service & Repair Hydraulic Systems and Components**

#### **Underpinning Knowledge**

**Candidate:** \_\_\_\_\_

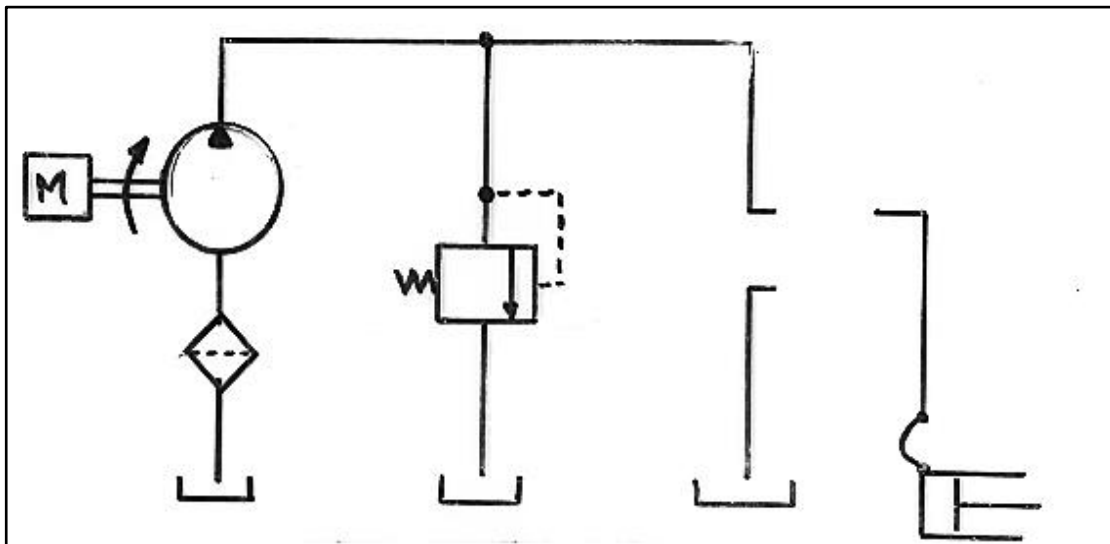
## OVERVIEW

The aim of this unit is to provide you with the knowledge, understanding and skills required to repair and service hydraulic systems.

This assignment consists of element two of this unit and successful completion will demonstrate that you understand the construction, function and operation of hydraulic circuit systems and their components.

Note: you are encouraged to use images to support your answers.

1. Below is a schematic of a simple hydraulic circuit. Draw (or copy/paste) this diagram then answer the questions below.



- a) There are eleven symbols shown. Identify and list them, and for each one state what it describes.
  - b) There is one blank area that needs a symbol. State an appropriate component that should be inserted here, and draw its symbol.
2. After testing, you suspect a fault in a recently replaced hydraulic pump and need to remove it from a machines' system to dismantle and inspect it.  
  
Describe the steps you would take to do this, starting with the machine coming into the workshop; any H&S actions; housekeeping; what you would look for inside the pump, to when the machine is signed off ready to go back to the customer.
  3. State the function of EIGHT of the following listed components and for each one give an example of their application:

- Pressure relief valve
- Flow divider valve
- Proportional valve
- Directional control valve
- Restrictor
- Shock valve
- Orbitrol valve
- Accumulator
- Variable displacement pump
- Fixed displacement motor

4. Briefly outline how a rotary orbitrol valve works when turning one way.
  
5. With regard to PISTON PUMPS, explain the differences between a:
  - Wobble plate pump
  - Fixed swash plate pump
  - Variable swash plate pump
  - Tilting head piston pump
  - Radial piston pump.
  
6. State the purpose of a “cushioned” cylinder and explain how this is achieved.
  
7. List TWO features a well-designed reservoir incorporates to minimize contamination, and TWO features to minimize aeration of the hydraulic fluid.
  
8. State the advantages of having a “Load-Sensing” system. Describe the components needed to make this possible and BRIEFLY outline its working principles.
  
- 9 (a) Explain the difference between Dual-Line braking and Failsafe braking.
- (b) Explain “Load-Sensing” in relation to braking systems.
  
- 10 (a) Identify the means of diagnostic testing in order to evaluate the performance of an hydraulic system.
- (b) Describe ONE suitable means of diagnostic testing used for interpreting and comparing results against manufacturers’ data.
- (c) State another valuable piece of test equipment commonly used for faultfinding (troubleshooting) hydraulic circuits.