

**BRITISH FLUID POWER
ASSOCIATION
QUALIFICATIONS
PRE-PROGRAMME
QUESTIONNAIRE – MOBILE
HYDRAULICS (MH3)**

NAME:

COMPANY:

DATE:

EMAIL ADDRESS:

The purpose of this questionnaire is to enable you and the staff at the National Fluid Power Centre to:

- (i) Identify your existing knowledge level
- (ii) Provide us with sufficient information to enable us to give you guidance and recommendations towards the best routes of study, enabling you to successfully complete the written examination.
- (iii) Enables us to formulate the content and subject areas for the one-day modules held at the NFPC throughout the year.
- (iv) Choose the option which best fits your workload and lifestyle.

PLEASE RETURN THIS COMPLETED QUESTIONNAIRE TO THE DIRECTOR, NATIONAL FLUID POWER CENTRE 21 DAYS BEFORE THE INDUCTION DATE/S _____

SECTION 1

- 1) Give a brief outline of your existing qualifications.

- 2) Give a brief outline of your practical experience involving the use and application of Fluid Power Systems.

- 3) Have you studied the content of the Mobile Hydraulics Programme MH3 (BFPA/Q2)? (Tick accordingly) YES / NO

- 4) Have you read the National Fluid Power Centre INFORMATION SHEET BPPA Industry Standard Qualifications? YES / NO

- 5) Do you have access to the Website? A great deal of technical information to support your studies is available through the web. YES / NO

- 6) Are you able to commit regular periods for study each week? YES / NO

- 7) Are you able to attend the technical 1-day modules provided by the NFPC throughout the year? (Normally 5 or 6 days is required to attend all) YES / NO

- 8) Are you aware that you have to attend the NFPC for practical task preparation and competence based assessment? (Normally up to 4 days depending upon your ability but we can be flexible.) YES / NO

SECTION 2 - Technical Knowledge Personal Assessment

It is important at this stage to give a realistic answer. The Level III programme is quite intense and the examination has a pass mark of 70%. With this in mind please consider your answers carefully and tick the necessary column. Many of the questions are formulated on the basis of “Can you explain” - YES / NO.

Fundamental Principles

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|--|----------|
| 1) Can you explain the difference between Cavitation and Aeration? | YES / NO |
| 2) Could you list 6 causes of cavitation? | YES / NO |
| 3) Do you know the relationship between Motor Torque, Displacement and Pressure? | YES / NO |
| 4) Would you be able to calculate the flow rate from a pump in litres per minute? | YES / NO |
| 5) Can you explain the difference between Laminar and Turbulent flow? | YES / NO |
| 6) Can you explain the term volumetric efficiency associated with a pump? | YES / NO |
| 7) Can you explain the causes of heat generation in a hydraulic circuit? | YES / NO |
| 8) Can you explain the term regenerative associated with cylinder operations? | YES / NO |
| 9) Do you know the formula for hydraulic power? | YES / NO |
| 10) Can you explain why fitting a throttle valve on the head end side of a cylinder can lead to intensification? | YES / NO |

Pressure Control

- | | |
|--|----------|
| 1) Can you explain the meaning of the term cracking pressure? | YES / NO |
| 2) Can you explain the difference in performance between:
a) Direct operating relief valve, or
b) Pilot operated two-stage relief valve? | YES / NO |
| 3) Can you explain the meaning of the term VENT associated with a two-stage relief valve? | YES / NO |
| 4) Can you explain the difference in performance between:
a) Two way pressure reducing valve, or
b) Three way pressure reducing valve? | YES / NO |

- 5) Can you explain the difference in performance between a 10:1 area ratio remote pilot counterbalance valve and a 3.5:1 area ratio valve? YES / NO
- 6) Can you explain the performance of a pump unloader valve? YES / NO
- 7) Can you explain the meaning of the term LOAD SENSING? YES / NO
- 8) Can you explain the performance of a proportionally controlled relief valve? YES / NO

Flow Control

- 1) Can you explain the performance of:
- a) A simple throttle valve YES / NO
 - b) A pressure compensated flow control YES / NO
 - c) A priority flow control valve YES / NO
 - d) A rotary flow divider YES / NO
 - e) A spool flow divider YES / NO
 - f) A differential lock unit YES / NO

Direction Control

- 1) Can you explain the difference in performance between:
- a) Pre-compensation and
 - b) Post compensation (flow sharing) YES / NO
- 2) Can you explain the difference between:
- a) Load sensing relief valves, and
 - b) Port relief valves YES / NO
- 3) Can you explain the difference in flow paths through a valve when comparing parallel, tandem and series? YES / NO
- 4) Can you explain the operation of a joystick used for pilot pressure control? YES / NO
- 5) Can you explain the difference between a slip in cartridge valve and a screw in cartridge valve? YES / NO
- 6) Can you explain the difference in construction between a NG6 (ISO 3) direction control valve and a NG25 (ISO 8) direction control valve? YES / NO
- 7) Can you explain why the lowering of a load may be erratic when using a pilot operated check valve for control? YES / NO
- 8) Do you know why a 'Y' port is fitted to a sequence valve yet not a relief valve? YES / NO
- 9) Do you know the difference between open centre and closed centre control? YES / NO

Hydraulic Fluids

- | | |
|---|----------|
| 1) Can you explain the meaning of the terms: | |
| a) Viscosity | YES / NO |
| b) Viscosity index | YES / NO |
| 2) Can you explain the difference between a premium grade hydraulic oil and a VI grade hydraulic oil? | YES / NO |
| 3) Can you explain the causes of: | |
| a) Oxidation | YES / NO |
| b) Dieseling | YES / NO |
| 4) New oil may have a code of 17/15, could you explain this term? | YES / NO |

Pumps and Pump Controls

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|--|----------|
| 1) Can you explain the difference in operation between a gear pump and vane pump? | YES / NO |
| 2) Can you explain the difference in performance using a Q/P curve for | |
| a) Pressure compensated (constant pressure pump), against | |
| b) Pressure compensated load sensing pump | YES / NO |
| 3) Can you explain the difference in displacement control between an axial piston swash plate pump and an axial piston bent axis pump. | YES / NO |

Hydrostatic Steering Systems

- | | |
|--|----------|
| 1) Can you explain the general layout and performance of an open centre steering system? | YES / NO |
| 2) Can you explain the function of the steering priority valve? | YES / NO |
| 3) Can you explain the difference between Dynamic and Non-dynamic steering systems? | YES / NO |
| 4) Can you explain the operation of a dual displacement unit? | YES / NO |
| 5) Can you explain the difference between a closed centre and open centre steering system? | YES / NO |

Hydraulic Motor and Actuators (Cylinders)

- | | |
|---|----------|
| 1) Can you identify three methods used to increase the torque from a variable displacement motor? | YES / NO |
| 2) Can you explain the principle of operation of a two-speed radial piston motor? | YES / NO |
| 3) Can you explain the principle of cylinder cushioning? | YES / NO |
| 4) Can you explain the difference in hydraulic terms between static and dynamic braking? | YES / NO |
| 5) Can you explain the term 140/100 with respect to the configuration of a cylinder? | YES / NO |

Closed Hydrostatic Transmissions

- | | |
|--|----------|
| 1) Do you know the basic building blocks of all closed hydrostatic systems? | YES / NO |
| 2) Can you explain the term dynamic braking? | YES / NO |
| 3) Can you explain creep speed when linked to the machine hydraulic motor/s? | YES / NO |
| 4) Can you explain the purpose of the: | |
| a) Charge pump | YES / NO |
| b) Hot oil shuttle valve | YES / NO |
| c) Hot oil shuttle valve back pressure RV | YES / NO |
| 5) Can you explain the term service brake and list the items that make up such a system? | YES / NO |

Accumulators

- | | |
|---|----------|
| 1) Can you explain the general construction of a bladder type accumulator? | YES / NO |
| 2) Do you know the basic layout of an accumulator safety block? | YES / NO |
| 3) Can you explain the procedures to be followed to pre-charge an accumulator? | YES / NO |
| 4) Do you know the type of Nitrogen that must be used to charge an accumulator? | YES / NO |

Contamination Control

- 1) Can you explain the meaning of the term 18/16/14 referring to cleanliness target levels? YES / NO
- 2) Do you know the various locations where filters are likely to be installed on a machine and the benefits of each location? YES / NO
- 3) Can you explain the term Beta Ratio? YES / NO

Installation/Commissioning/Fault Diagnosis

- 1) If asked to install and commission a pressure compensated pump on to a machine that requires fully setting up on site, would you be able to plan and formulate the procedures to do this job? YES / NO
- 2) If confronted with a machine breakdown, are you familiar with the F.C.R. approach to fault diagnosis? YES / NO

Hydraulic Symbols

- 1) Can you read and interpret circuit diagrams?

TICK	POOR				GOOD
	1	2	3	4	5

- 2) Would you be able to draw a circuit diagram using current symbols? YES / NO

Hydraulic Reservoirs

- 1) Do you know the basic requirements for a good reservoir design, relating to:
 - a) Size YES / NO
 - b) Internal layout/configuration of flow YES / NO
 - c) Contamination control YES / NO
 - d) Fluid sampling YES / NO
 - e) Fluid filling arrangements YES / NO
 - f) Pipe work layout YES / NO

Hydraulic Pipes and Hoses

- 1) Can you list the points to be considered when selecting a hydraulic hose for a particular job? YES / NO
- 2) Do you know the difference between a BSP adaptor and a JIC adaptor? YES / NO
- 3) Do you know the factors that affect the pressure drop in a pipe? YES / NO

FOR OFFICIAL USE

Reviewed by:

Date:

Comments:

Checked by Director:

Date:

Comments:

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