



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

DIESEL PLANT FITTING

**MODULE: Hydraulics and Braking System PAPER NO: 319/22/M01
Maintenance**

DURATION: 3hours

NOVEMBER/DECEMBER 2025 EXAMINATION

REQUIREMENTS

Pen, drawing instruments and answer booklet

INSTRUCTIONS TO CANDIDATE

- 1) **Section A: Answer all questions (65 marks).**
- 2) **Section B: Answer all questions (35 marks).**

This paper consists of 4 printed pages.

SECTION A

QUESTION 1

- a) Define the following hydraulic terms:
- i) Pressure (1 mark)
 - ii) Viscosity (1 mark)
 - iii) Hydrostatics (1 mark)
 - iv) Hydrodynamics (2 marks)
 - v) Cavitation (2 marks)
 - vi) Aeration (2 marks)
- b) State the meaning of pilot pressure. (2 marks)
- c) Give one (1) advantage of a telescopic cylinder. (1 mark)

QUESTION 2

- a) State one (1) advantage of double acting cylinder. (1 mark)
- b) Give four (4) causes of pump cavitation. (4 marks)
- c) Hydraulic valves fall under three (3) main categories, state them. (3 marks)
- d) List three (3) basic types of accumulators. (3 marks)
- e) Give the other name for a positive displacement pump. (1 mark)

QUESTION 3

- a) State the two (2) items which create pressure in a hydraulic system. (2 marks)
- b) List the hydraulic component which is responsible for creating flow. (1 mark)
- c) State two (2) types of hydraulic oil coolers. (2 marks)
- d) State Pascal's Law. (2 marks)
- e) Give three (3) causes of aeration in a hydraulic system. (3 marks)
- f) Give two (2) causes of premature wear of a hydraulic motor. (2 marks)

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QUESTION 4

- a) Draw a well labelled diagram of a hydraulic jack. (9 marks)
- b) Explain how it operates:
 - i) During raising (3 marks)
 - ii) During lowering (3 marks)

QUESTION 5

- a) State six (6) rules to be observed when installing hydraulic hoses so that they look neat and nice in a hydraulic system. (6 marks)
- b) Give three (3) materials used in the manufacturing of hydraulic hoses. (3 marks)
- c) List four (4) precautions to be observed when charging pneumatic accumulators. (4 marks)
- d) Give the factor of safety of a pipe. (1 mark)

QUESTION B

QUESTION 6

- a) Define pneumatics. (2 marks)
- b) Give the function of the following air braking system components:
 - i) Relay valve (2 marks)
 - ii) Load sensing valve (2 marks)
 - iii) Governor, valve (2 marks)
 - iv) Differential pressure protection valve (2 marks)
 - v) Foot valve (2 marks)

QUESTION 7

- a) Define SAHR brakes. (4 marks)
- b) State (five) good properties of brake fluid. (5 marks)
- c) State three (3) types of master cylinders used in hydraulic brakes. (3 marks)

QUESTION 8

- a) List three (3) advantages of the twin leading shoe assembly. (3 marks)
- b) Differentiate between a leading and trailing shoe assembly. (2 marks)
- c) Explain the procedure of brake adjustment on a rigid vehicle using air brakes. (6 marks)

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