



ZIMBABWE

MINISTRY OF HIGHER AND TERTIARY EDUCATION

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

DIESEL PLANT FITTING

SUBJECT: Technology

PAPER NO: 319/S01

OCTOBER / NOVEMBER 2013 EXAMINATION

REQUIREMENTS

Drawing instruments

INSTRUCTIONS TO CANDIDATE

1. Section A: Answer all questions (20 marks).
2. Section B: Answer all questions (20 marks).
3. Section C: Answer any five questions (60 marks).

This paper consists of 5 printed pages.

SECTION A

Answer all questions

QUESTION 1

- a) Give two advantages of the leading and trailing shoe brake assembly on a truck. (2 marks)
- b) Write two functions of a check valve on hydraulic braking system. (2 marks)
- c) Noisy operation when concerning on a rear axle is a result of _____. (1 mark)
- d) Give one type of grease. (1 mark)
- e) _____ is one of the requirements for efficient combustion. (1 mark)

QUESTION 2

- a) What are the two functions of a fillet on the crankshaft? (2 marks)
- b) Give three examples of filter element materials. (3 marks)
- c) Identify three factors that are considered on pump rating. (3 marks)

QUESTION 3

- a) A cam foundation brake assembly has, generally, the same components as a single – or double – anchor hydraulic brake having a double – end wheel cylinder.

List any three components found on this brake assembly (cam foundation). (3 marks)

- b) What is the function of a Tractor Protection valve? (2 marks)

SECTION B

Answer all questions.

QUESTION 4

- a) Give three reasons why a high degree of turbulence is necessary in diesel engines. (3 marks)
- b) Write any two tests done on injectors. (2 marks)
- c) Give two liners used in automotive engines. (2 marks)

QUESTION 5

- a) State three advantages of water cooled engines. (3 marks)
- b) State two disadvantages of water cooled engine. (2 marks)
- c) State two properties of brake fluid. (2 marks)

QUESTION 6

- a) Give five causes of engine knocking. (5 marks)
- b) State one type of fuel system used by caterpillar diesel engines. (1 mark)

SECTION C

Answer any five questions. Each question carries 12 marks.

QUESTION 7 ✓

✕ Define the following diesel engine fuels terms.

- a) Flash point (2 marks)
- b) Calorific value (2 marks)
- c) Self-ignition temperature (2 marks)
- d) Pour point (2 marks)
- e) Cloud point (2 marks)
- f) Specific gravity (2 marks)

QUESTION 8

Draw symbols of the following hydraulic components.

- a) Pressure relief valve (2 marks)
- b) Pressure-compensated flow control valve. (2 marks)
- c) Hydraulic pump. (2 marks)
- d) Hydraulic motor (variable displacement bent axis) (2 marks)
- e) Check valve (2 marks)
- f) Double acting cylinder (2 marks)

QUESTION 9

- a) State the purpose and location of the following in Automatic Transmission.
 - i) Manual selector valve (2 marks)
 - ii) Centrifugal governor regulating pressure (2 marks)
 - iii) Ristrict valve (2 marks)
 - iv) Regulating valve (2 marks)
 - v) Kid down switch (2 marks)
- b) Explain a live axle and a dead axle. (2 marks)

QUESTION 10

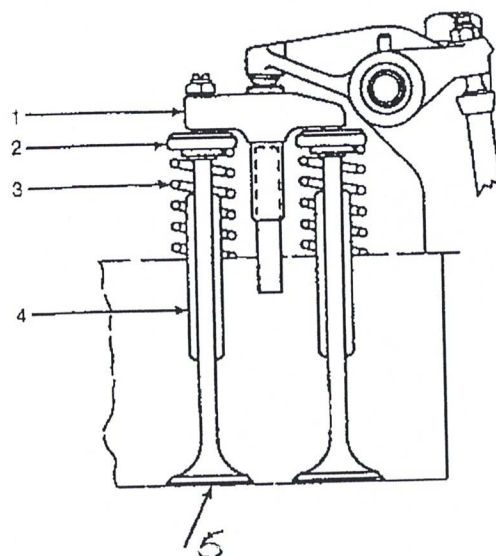
- a) State four (4) functional requirements that all steering systems must be capable of meeting. (8 marks)
- b) List two applications of the fully floating axle. (2 marks)
- c) The negative plates of an acid battery on charging changes to ____, on discharging they change to _____. (2 marks)

QUESTION 11

- a) Draw neat diagrams of 4 types of combustion chambers used on direct injection engines. (8 marks)
- b) Give any four components, found in a westgate turbo charger. (4 marks)

QUESTION 12

Valve bridge being used to operate two valves from the one rocker lever



- a) Name components 1 -5. (5 marks)
- b) A typical single element Flange – mounted pump consists of six major parts. Name the parts. (6 marks)
- c) ___ acts as a non-return valve, so maintaining some pressure in the injector line. (1 mark)

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