



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

DIESEL PLANT FITTING

**SUBJECT: Workshop Practice and
Processes**

PAPER CODE: 319/21/S02

DURATION: 3 Hours

MARCH/APRIL 2022 EXAMINATION

REQUIREMENTS

Pen, Pencil , Ruler, Drawing Instruments, calculator

INSTRUCTIONS TO CANDIDATE

- 1. Section A: Answer ALL questions. (20 marks)**
- 2. Section B: Answer ALL questions. (20 marks)**
- 3. Section C: Choose any FIVE (5) questions. (60 marks)**
Each question carries 12 marks.

SECTION A

(20 marks)

Answer ALL questions.

QUESTION 1

- a) State two causes of hydraulic cylinder drift or creep in operation. (2 marks)
- b) List two functions of a final drive unit. (2 marks)
- c) Define phasing. (2 marks)
- d) Give four precautions to be observed when dealing with vehicle batteries. (4 marks)

QUESTION 2

- a) List three causes of clutch shudder/judder. (3 marks)
- b) State five causes of overheating on a water cooled diesel engine. (5 marks)
- c) Which piston ring is used as the top compression ring on a worn engine cylinder bore? (2 marks)

SECTION B

(20 marks)

Answer ALL questions.

QUESTION 3

- a) Give four (4) causes of oil and water mixing in a diesel engine. (4 marks)
- b) Identify two (2) causes of engine blowby. (2 marks)
- c) State four causes of black smoke being emitted by a diesel engine. (4 marks)

QUESTION 4

- a) List five precautions to be observed when carrying out wheel alignment on a machine. (5 marks)
- b) Outline the procedure for connecting and disconnecting battery terminals from an earthmoving equipment. (4 marks)
- c) Give one possible cause of a starter motor operating but not turning the engine. (1 mark)

SECTION C

(60 marks)

Choose any FIVE (5) questions. Each questions carries 12 marks.

QUESTION 5

During an engine overhaul the following information was extracted from a workshop manual.

- i) Crankshaft mains diameter – 64mm at standard.
- ii) Big ends – 48 mm at standard.
- iii) Bearing oil clearance – 0.02mm.
- iv) Regrind stages – up to 3 stages or 30 thousand of an inch.

- a) What is meant by the statement number (i)? (1 mark)
- b) Give the size of the crankshaft mains diameter at the third stage of grinding. (2 marks)
- c) If the shell bearing thickness is 3.22 mm at standard, what would be its size at the second stage of grinding. (2 marks)
- d) Give three causes of cylinder bore wear. (3 marks)
- e) Explain the procedure of measuring piston ring working gap. (4 marks)

QUESTION 6

Describe in detail the procedure for pressure testing a power shift transmission on a bulldozer. (12 marks)

QUESTION 7

- a) Explain in a logical sequence how one can test a faulty thermostat from a water cooled engine. (4 marks)
- b) State four causes of low oil pressure in an engine. (4 marks)
- c) Give four factors to be observed when installing hydraulic lines on a machine. (4 marks)

QUESTION 8

- a) List six factors that would result in a hydraulic relief valve having no pressure. (6 marks)
- b) Give three advantages of using cutting fluid or coolant during drilling. (3 marks)
- c) State three precautions to be observed when dealing with rotating machines in the workshop. (3 marks)

QUESTION 9

Explain the procedure for scribing a timing mark on a six cylinder inline pump.
(12 marks)

QUESTION 10

- a) Describe the procedure to be followed when adjusting hydraulic drum brakes on a four wheeled vehicle. (6 marks)
- b) Give six factors that would result in noise being produced from the final drive unit when in motion. (6 marks)

QUESTION 11

- a) State four causes of clutch slip. (4 marks)
- b) Give four causes of clutch drag. (4 mark)
- c) Identify four causes of gear whine from a manual gear box. (4 marks)

QUESTION 12

- a) List any five checks which are carried out on a recirculating ball and nut steering box during dismantling and assembling. (5 marks)
- b) State four causes of excessive leak off on a multihole injector nozzle. (4 marks)
- c) Give the function of the helper spring in the leaf spring suspension system. (2 marks)
- d) The purpose of the swinging shackle on a suspension is
to..... (1 mark)

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