



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

FABRICATION ENGINEERING

**MODULE: Boiler Making Quality Assurance PAPER NO: 324/22/M04
324/25/M04**

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

Answer booklet

INSTRUCTIONS TO CANDIDATE

- 1) This paper consists of five (5) questions.
- 2) Each question carries twenty (20) marks. Total marks 100.
- 3) Do not write your name inside or outside the answer booklet,
- 4) Do not write anything in the question paper.
- 5) Start each question on a fresh page.

This paper consists of 3 printed pages.

QUESTION 1

- a) List any five (5) causes of distortion with reference to welding. (5 marks)
- b) Briefly explain the term residual stress, with reference to distortion. (2 marks)
- c) With reference to distortion, briefly explain the following terms:
- i) Pre setting (2 marks)
 - ii) Bowing (2 marks)
 - iii) Buckling (2 marks)
 - iv) Balanced welding [(2 marks)
 - v) Intermittent welding (2 marks)
- d) Give any three (3) ways of minimising distortion, before a welding operation. (3 marks)

QUESTION 2

- a) With reference to welding, name any five (5) factors to be considered when making an assessment of weld quality. (5 marks)
- b) Sketch the following weld defects and give one (1) cause of each of the mentioned weld defects:
- i) Crack (3 marks)
 - ii) Overlap (3 marks)
 - iii) Excessive spatter (3 marks)
 - iv) Incomplete fusion (3 marks)
 - v) Slag inclusion (3 marks)

QUESTION 3

- a) With reference to non-destructive testing methods, state any four (4) limitations of the test methods. (4 marks)
- b) With the aid of a sketch, briefly explain the following non-destructive testing methods:
- i) Ultrasonic testing method (8 marks)
 - ii) Magnetic particle testing method (8 marks)

QUESTION 4

- a) With reference to destructive testing methods, state any four (4) general advantages of the testing methods. (4 marks)
- b) With the aid of a sketch, briefly explain the following destructive testing methods:
- i) Charpy impact testing method (8 marks)
- ii) Vickers testing method (8 marks)

QUESTION 5

A boilermaker has been given a railway wagon coupler which has developed a crack the coupler is made from an alloy steel. In point form, explain how the boilermaker is going to repair the coupler. Give reason or reasons for each step the boilermaker takes when repairing the coupler. (20 marks)

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