



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

FABRICATION ENGINEERING

MODULE: Steel Components Fabrication

PAPER NO: 324/22/M02

DURATION: 3 Hours

NOVEMBER / DECEMBER 2025 EXAMINATION

REQUIREMENTS

1. Answer booklet.
2. Non – programmable scientific calculator

INSTRUCTIONS TO CANDIDATE

1. Section A: This section has five (5) questions. Each question carries six (6) marks. Answer all questions.
2. Section B: This section has four (4) questions. Each question carries fifteen (15) marks. Answer any three (3) questions only.
3. Section C: This is a compulsory question. The question carries twenty five (25) marks.
4. Do not write your name inside or outside the answer script.
5. Do not write anything in the question paper.

This paper consists of 4 printed pages.

SECTION A

QUESTION 1

- a) i) With reference to bench work, list any three (3) types of vices. (3 marks)
- ii) State any three (3) precautions that should taken when cutting using hand hacksaws. (3 marks)
- b) i) With reference to measuring and marking out, state any two (2) uses of the scribing block. (2 marks)
- ii) Briefly describe the following terms:
- Datum line (2 marks)
- End measurement (2 marks)
- c) With reference to materials, briefly describe the following terms and give one (1) example of each:
- i) Ferrous metal (2 marks)
- ii) Thermoplastic (2 marks)
- iii) Thermosetting plastic (2 marks)
- d) i) Briefly explain the term heat treatment. (2 marks)
- ii) Briefly explain the following heat treatment terms:
- i) Carburising (2 marks)
- ii) Nitriding (2 marks)
- e) With reference to joining and fastening, sketch the following types of rivet heads:
- i) Countersunk head (120°) rivet (2 marks)
- ii) Mushroom head (2 marks)
- iii) Pan head (2 marks)

SECTION B

QUESTION 2

- a) With reference to arc welding, briefly describe the following:
- i) Arc blow (2 marks)
 - ii) Fusibility (2 marks)
 - iii) Heat affected zone (2 marks)
- b) With reference to gas welding briefly explain the left ward welding technique with the aid of a labelled diagram. (9 marks)

QUESTION 3

- a) With reference to thermal cutting, briefly explain the following flame zones:
- i) Innermost zone (3 marks)
 - ii) Primary zone (3 marks)
 - iii) Outer envelope (3 marks)
- b) Briefly explain the following gouging techniques.
- i) Spot gouging (3 marks)
 - ii) Progressive gouging (3 marks)

QUESTION 4

- a) With reference to mechanical cutting, name the angle of inclination of a guillotine cutting or shearing blade. (1 mark)
- b) Briefly explain the following mechanical cutting terms:
- i) De-burring (3 marks)
 - ii) Shearing (3 marks)
- c) Briefly explain the effect of the following clearances, on a shearing machine:
- i) Too much clearance (2 marks)
 - ii) Small clearance (2 marks)
 - iii) Correct clearance (2 marks)
- d) State any two (2) factors affecting mechanical cutting in the workshop. (2 marks)

QUESTION 5

With the aid of diagrams differentiate between air bending and coining.
(15 marks)

SECTION C

QUESTION 6

- a) With reference to structural work, briefly describe the following, with the aid of a sketch:
- i) Beam (3 marks)
 - ii) Gusset (3 marks)
 - iii) Splicing (3 marks)
- b) Sketch and label the following lattice girders.
- i) The N-type lattice girder (3 marks)
 - ii) The Warren – type lattice girder (3 marks)
- c) Briefly explain why feathery and sharp edges must be cut off from a gusset plate during fabrication. (2 marks)
- d) Briefly explain three (3) functions of a stanchion base. (3 marks)
- e) Give five (5) reasons why steel is widely used in structured work. (5 marks)

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