



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Advanced Level

METAL TECHNOLOGY AND DESIGN

6040/4

PAPER 4 Design Project

NOVEMBER 2019 SESSION

No additional materials are required.

INSTRUCTIONS TO CANDIDATES

Attempt **one** option only.

This question paper consists of 3 printed pages and 1 blank page.

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General Notes

When candidates are working on these projects, teachers should refer to the syllabus explaining the Design Process and to the other design literature and texts.

LITERATURE AND TEXTS FOR GUIDANCE

- Industrial Waste Management
- Solid solution (alloying)
- Working Properties and Characteristics of materials
- Industrial Manufacturing Process
- Systems of Manufacturing
- Cultural and Technological Influences on Design
- Design Process Models (Computer Aided Design (CAD))
- Intellectual Property Rights
- Mechanisms
- Structures
- Electronics (Sensors and Logic Gates)
- Engineering calculations
- Graphic Engineering
- Value Addition and Beneficiation
- Workshops tests of Engineering Materials
- Manufacturing
- Quality Control Systems
- Automation – ICT Tools

PROJECT TIPS

The use of ICT tools and equipment is strongly encouraged.

Project should be submitted by end of November in Form Five (5) and October in Form Six (6).

Quality projects will score high marks

Illustrations can be done in the form of sketches, pictures, cuttings and formal drawings

Competencies

- Planning
- Researching
- Problem solving
- Analytical thinking
- Drawing and Design
- Synthesizing
- Manufacturing

Objectives to be assessed

- to demonstrate research skills
- to demonstrate drawing and designing skills
- to demonstrate correct use of tools and equipment

PROJECT CONTENT: Solving real life problems.

Candidates should choose **one option only** and produce a:

- (i) detailed **A3 Design Folio** showing the development of the design process from the situation through to the final drawings of the solution. The final section of the folio should include the evaluation,
- (ii) well constructed mock-up/model of the chosen solution, in any suitable material,
- (iii) well constructed artefact of the chosen solution.

OPTION 1 MACHINE WORK

In Zimbabwe vending has become a source of livelihood in most families. Some families earn a living through selling of domestic and wild fruits. However, some fruits get easily damaged when they fall off from a height making them unsuitable for sale.

Design and make a suitable device that can be used to safely collect the fruit from the tree. The device should be adjustable for height and size of fruit.

OPTION 2 SHEET METALWORK

Flour, salt, sugar and egg are some of the basic ingredients used to make homemade bread popular in both rural and urban homes.

Design and make a device that can be used to mix the ingredients. The device should be user friendly and easy to operate.

Design and make a scaled unit that can hold an electric tower light protected from all weather conditions and from monkeys that are a common sight at the hotel during the day. Your design solution should include at least **three** forgework processes.

NB Candidates are allowed and encouraged to produce a scaled down version of their design when realising the artefact should be given in the Folio. Candidates are also encouraged, where possible to use and combine different and relevant materials e.g metal, wood or plastic in realising their designs but the predominant material should be metal.

