ZIMSEC
For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Advanced Level

TECHNICAL GRAPHICS AND DESIGN **6047/3**
PAPER 3 Product Design

SPECIMEN PAPER 20 hours

Additional materials:
A3 drawing paper

TIME 20 hours

INSTRUCTIONS TO CANDIDATES

Answer **one** question only.

Candidates must select **either** the Building theme **or** the Mechanical theme.

On no account should candidates **attempt to send 3D products to ZIMSEC** for marking purposes. Only the **FOLIOs** for the Centre should be submitted.

This question paper consists of 4 printed pages.

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General Notes

Teachers refer to **Section** of the syllabus explaining the Design Project, for guidance.

Candidates are expected to formulate a project brief from the given theme. The project is to be done in a period of **20 hours,** under the supervision of the teacher.

- **A3** drawing paper should be used in the form of a Log Book/ Design Folio.
- Freehand sketches of components and of ideas conceived and developed are a pre-requisite.
- **Three** photographs showing an overall view and detailed evidence of the level of achievement reached on the model and/or final product are to be included in the Design Folio.

Attempt One Question Only

OPTION A Building

Question 1

A potential shop owner has acquired a **280 m²** business stand bordering other stands and a service road. This piece of land is too small for his requirements such as a storage room for his wares, coldroom, bathrooms and staff quarters. He also wishes to maximise shop floor space. There is not much room for expansion laterally beyond this area but vertically.

The design should consider and include the following:

- sewer system,
- stairs,
- ventilation,
- loading bay,
- masonry.

The complete project should include:

(i) floor plan showing details and well dimensioned features,
(ii) at least **two** elevations projected from the floor plans,
(iii) a sectional elevation to show foundation , floor, wall and roof details,
(iv) an axonometric drawing of **one** of the rooms to show internal details.

[100 marks]

Question 2

A retired teacher intends establishing a school within his/her residence. The local authority permits him/her to set up the structures. The area permitted to put up the buildings measures **130m** by **87m.** The school would run a single class each from form 1 to form 6**, two** science laboratories, a drawing room, an administration block, a staff room and all other necessary structures.

The complete project should include:

(i) floor plans showing details and well dimensioned features of one of the blocks that houses the drawing room,
(ii) at least **two** elevations projected from the floor plans,
(iii) a sectional elevation to show foundation, floor, walls and roof details,
(iv) an axonometric drawing of one of the rooms to show internal details.

[100 marks]

OPTION B Engineering

Question 3

A Chief Executive Officer has a problem with his sitting position as he needs to adjust horizontally and vertically in order to perform efficiently.

The design should incorporate, among other things, the following:

- bearings,
- lubrication,
- seals,
- shafts,
- wheels.

The complete project should include:

(i) complete assembled drawings, at least **three** views, which should include an end view, a front view and a plan,
(ii) a sectional view as one of the **three** views in **(i)** above, to show internal details of operational features such as shafts, bearings and lubrication,
(iii) a pictorial impression of the design.

[100 marks]

Question 4

Huge trees between buildings result in blocked gutters due to leaves accumulating on building tops. Unsystematic cutting down of branches causes damages to roof tiles and other roofing materials.

A facility for gripping branches as they are being cut and brought down to the ground is required.

The design should incorporate the following among other items/ components:

- bearings,
- lubrication,
- seals,
- shafts,
- gears.

The complete project should include:

(i) complete assembled drawings showing at least **three** views that should include an end view, a front view and a plan,
(ii) in one of the above three views in **(i),** a sectional view to show internal details of operational features like gears, shafts, bearings and lubrication,
(iii) fully dimensioned features and a detailed parts list,

(iv) a pictorial impression of the design.

[100 marks]