



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

**CIVIL ENGINEERING, QUANTITY SURVEYING, VALUATION AND ESTATE
MANAGEMENT, WATER RESOURCES AND IRRIGATION MANAGMENT**

**SUBJECT: Civil Engineering Drawing and
Construction**

PAPER NO: 313/13/S08

DURATION: 4 hours

OCTOBER/NOVEMBER 2018 EXAMINATION

REQUIREMENTS

1. Scientific Calculator.
2. A3 drawing paper.
3. Drawing instruments.
4. Window catalogue.

INSTRUCTIONS TO CANDIDATE

1. Answer any two (2) questions in Section A.
2. Answer any two (2) questions in Section B.

This paper consists of 5 printed pages.

SECTION A

QUESTION 1

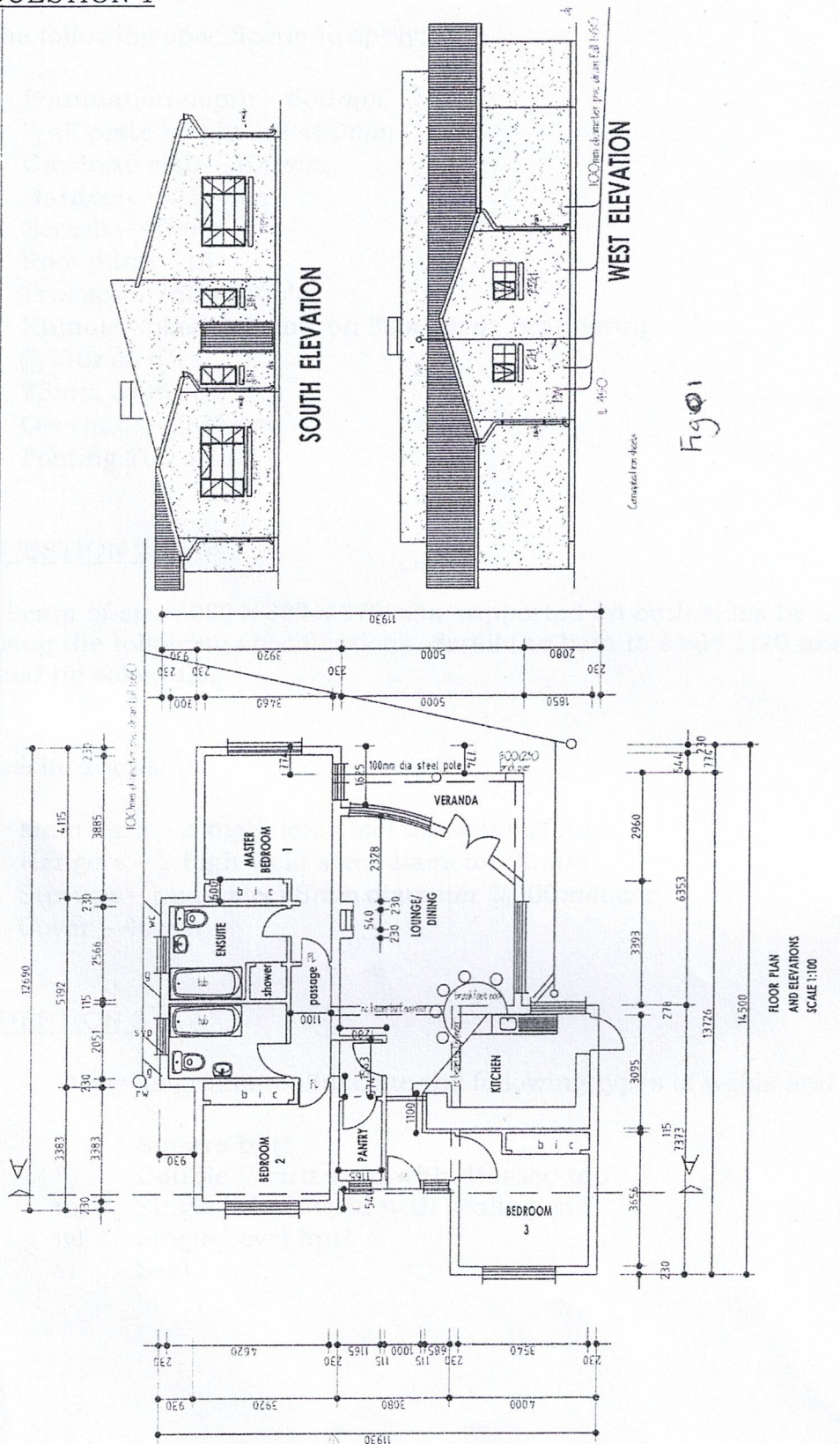


Fig. 1.

Fig. 1 shows a plan and elevations for a residence in Dangamvura. From Section A-A, draw the view using a scale 1:50. (25 marks)

The following specifications apply:

- Foundation depth – 600mm
- Wall plate height – 2 400mm
- Concrete slab – 100mm
- Hardcore – 150mm
- Screed – 40mm
- Roof pitch - 15°
- Trusses – 750mm/c/c
- Rhinaset plaster board on 38 × 38mm brandering
- @400mm c/c
- 75mm coved cornice
- Overhang – 900mm
- Footing 700 × 200

QUESTION 2

A beam of span 600 × 300 × 3700mm supported on both sides by a brick wall 230mm. Using the following specifications, detail the bam to scale 1:20 and prepare a bar bending schedule. (25 marks)

Specifications:

- Main bars – 3 high field steel diameter 20mm
- Hangers – 2 high yield steel diameter 20mm
- Stir ups – plain steel 8mm diameter @200mm c/c
- Cover – 40mm

QUESTION 3

a) Draw diagrams to illustrate the following types of welds and their symbols:

- | | | |
|------|-------------------------------------|-----------|
| i) | Square butt | (3 marks) |
| ii) | Double V butt weld with dressed top | (3 marks) |
| iii) | Single V butt weld with sealing run | (3 marks) |
| iv) | Single bevel butt | (3 marks) |
| v) | Seal | (3 marks) |

- b) Form the bracket in Fig. 2 draw the following views:

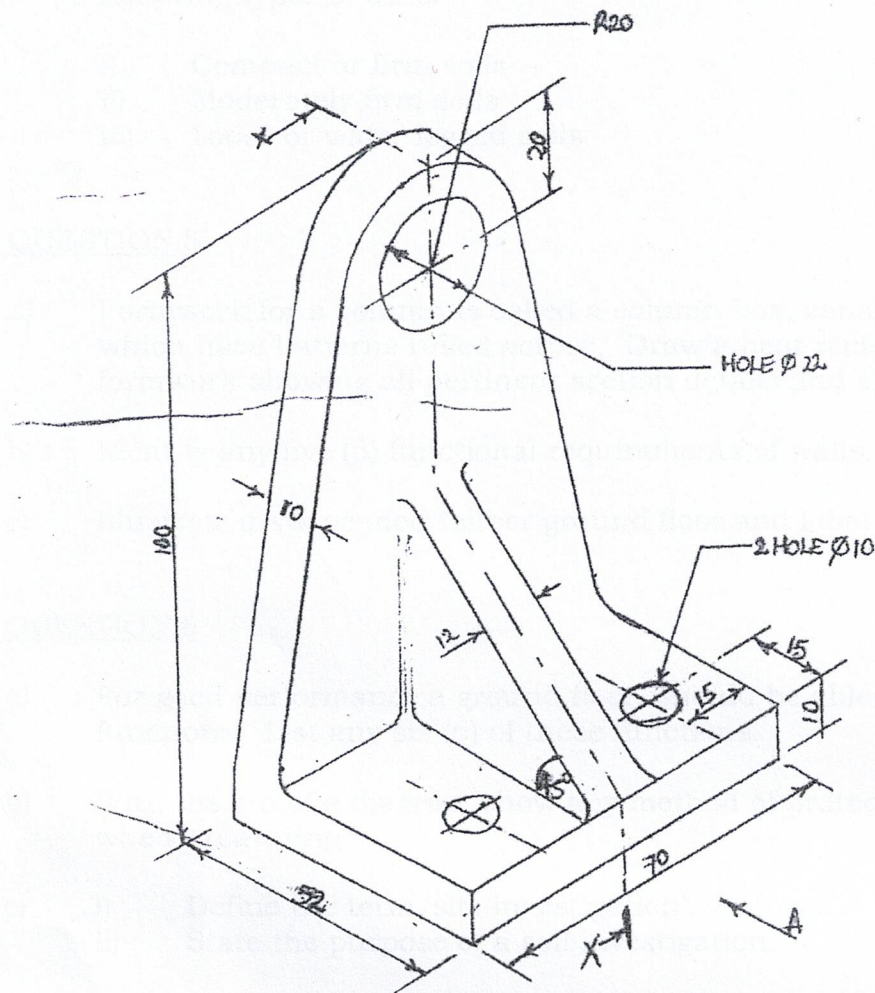


Fig. 2.

- | | | |
|-----|--|-----------|
| i) | Front elevation in the direction of arrow A. | (5 marks) |
| ii) | Sectional end elevation on this section plane X - X. | (5 marks) |

SECTION B

QUESTION 4

- | | | |
|----|--|------------|
| a) | Give two (2) building regulations that apply to stairs. | (2 marks) |
| b) | With the aid of a neat diagram, draw part of a timber staircase. | (10 marks) |

- c) With the aid of neat sketches show the methods of timbering trenches for the following types of soils.
- | | | |
|------|-----------------------------|-----------|
| i) | Compact or firm soils | (4 marks) |
| ii) | Moderately firm soils | (4 marks) |
| iii) | Loose or water logged soils | (5 marks) |

QUESTION 5

- a) Formwork for a column is called a column box, consisting of vertical boards which have battens railed across. Draw a neat rectangular column, formwork showing all pertinent section details and elevations. (10 marks)
- b) Identify any five (5) functional requirements of walls. (5 marks)
- c) Illustrate a suspended timber ground floor and label fully. (10 marks)

QUESTION 6

- a) For good performance a ground floor, should be able to perform certain functions. List any six (6) of these functions. (6 marks)
- b) With the aid of a diagram show any method of protecting existing buildings when excavating. (12 marks)
- c) i) Define the term 'site investigation'. (3 marks)
ii) State the purpose of a soil investigation. (4 marks)

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