



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF THE BUILT ENVIRONMENT**

**DEPARTMENT OF ARCHITECTURE**

**BUILDING CONSTRUCTION III**

**AAR 3108**

**Examination Paper**

**December 2017**

This examination paper consists of 2 pages

**Time Allowed: 4 hours**

**Total Marks: 100**

**Special Requirements: A1 DRAWING BOARDS, A1 PLAIN SHEETS OF PAPER, MASKING TAPE.**

**Examiner's Name: E. Munaku**

**INSTRUCTIONS**

1. Answer **ALL** questions
2. Answer question 1 on an A1 sheet/s of paper provided

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	<b>60</b>
2.	<b>20</b>
3.	<b>20</b>
<b>TOTAL</b>	<b>100</b>

### Question 1

Representatives of a major retail chain have approached you for professional consultancy. They have acquired a 2000 m<sup>2</sup> site and require a low maintenance 20x 30m warehouse with a central sky-lit atrium through the 3 levels above ground. A dry basement covering the building foot print with natural lighting is also required.

In your site investigations you discover that the site has a gentle slope and a very high water table resulting in constant waterlogging

- a. With clear labelled sketches, give an account of all the various ground water control methods that are available and identify a suitable one and detail how it can be implemented in the project. (10)
- b. Draw a typical floor plan (1:100) showing the structural system, vertical circulation, ablutions and fenestrations. (15)
- c. Draw a cross section of the building (1:50) detailing the structural system and foundations, with blow-ups (1:20) of all the waterproofing details, rainwater evacuation details and damp control. (20)
- d. Give a detailed account of all the areas that require scaffolding, shoring and formwork techniques in the construction phases and show by sketches how they set up. (15)

### Question 2

A single storey building measuring 15x25m with a concrete strip foundation and floating slab on a compacted hardcore requires a new dry basement measuring 15x15m to be constructed.

With clear sketches detail the procedures, techniques and equipment involved in the construction of the new basement level. (20)

### Question 3

- a. Give the different soil types that can be found on a site and highlight their various properties (5)
- b. Sketch the different types of foundation systems that can be used in the construction of buildings and relate their appropriateness to the soil types given above. (5)
- c. Based on the foundation system above; identify, justify and sketch the appropriate system in the construction of;
  - i. 10 storey building in Harare CBD (5)
  - ii. Double storey shopping mall in Victoria Falls (5)