



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF BUILT ENVIRONMENT**

**DEPARTMENT OF ARCHITECTURE**

**BUILDING SERVICES ONE**

**AAR 3103**

**Supplementary Examination Paper**

**July 2017**

This examination paper consists of 3 pages

**Time Allowed: 3 hours**

**Total Marks: 100**

**Special Requirements: None**

**Examiner's Name: Muvungani R.**

**INSTRUCTIONS**

1. Answer any four questions
2. Each question carries 25 marks
3. Use of calculators is permissible

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	25
2.	25
3.	25
4.	25
5.	25
<b>TOTAL</b>	<b>100</b>

### Question One

- a) Describe any four cable containing systems that are used to house electric cables in buildings [4]
- b) Distribution of light from luminaires can conveniently be described by a system of numbers. Justify the use of these luminaires in light designing and describe 5 classes of luminaires that are available in the market [7]
- c) A class room of dimensions 16m x 7m x 3.5m is to be illuminated to a design level of 400 lux using 65W fluorescent fittings having a BZ classification of 4 and an installed flux of 5500 lumens per fitting. The working plane of the office is 0,85m. If the utilization factor and the maintenance factors are 0.8 and 0.9 respectively, design a lighting system for the office [14]

### Question Two

- a) Justify the application of an alcove arrangement on lifts designing [5]
- b) Escalators pose one major problem of creating large floor openings, which actually encourage the spread of fire to next floors in an event there is a fire outbreak. Explain design measures that can be followed to address this problem [10]
- c) Discuss the likely consequences to public users if a legislation to replace conventional electricity water heaters with solar water heaters is enacted [10]

### Question Three

- a) Explain the following terms in relation to water treatment process
  - i. Oxidation [2]
  - ii. Coagulation [2]
  - iii. Flocculation [2]
  - iv. Ultraviolet radiation [2]
  - v. Fluoridation [2]
- b) Discuss any two methods of softening hard water. [15]

#### **Question Four**

- a) Discuss factors that you would need to consider when selecting the most appropriate fire fighting installation in any building under concern. [12]
- b) The NUST administration building has an automatic sprinkler system that serves as a first aid measure whilst waiting for the fire brigade team, if any part of the building catches fire. Debate the suitability of the system in this building. [13]

#### **Question Five**

- a) A proposed building is to have 25 storeys. It is still undergoing a feasibility study and has been discovered that the water mains pressure will not be adequate to supply upper floors.
- b) As part of the team carrying out the study advise, with the aid of clear sketches, on how the cold water can be supplied to such a building. [25]