NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF LANDSCAPE ARCHITECTURE AND URBAN DESIGN

BSC PROPERTY DEVELOPMENT AND ESTATE MANAGEMENT

BUILDING SERVICESII

AAR 3203

Main Examination Paper

July 2016

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: Mr R Muvungani

INSTRUCTIONS

1. Section A is **compulsory**and answer any two questions in Section B

MARK ALLOCATION

QUESTION	MARKS (SELECTED FOUR)
1.	**30**
2.	**30**
3.	**20**
4.	**20**
5.	**20**
6.	**20**

SECTIONA - COMPULSORY

Question 1

a) Describe the procedure you would follow to carry out a soil percolation test prior to designing a septic system. (10)

b) Design a septic system for a household of 15 people on a hectare plot in Kensington, and explain how it works to your client. (20)

[30]

Question 2

a) A room measuring 15x10x4 requires ventilation by means of a ductwork to provide 7 air changes per hour. If the average velocity of air in the duct is 0.5m/sec, calculate the diameter of the main circular duct for the room. (8)

b) A tenant in one of the properties you are managing has brought to your attention the need to improve the thermal comfort of the property, which wholly relies on natural ventilation, and would thus need alterations to accommodate any proposed changes.

i. Explain any three mechanical ventilation systems that can be considered to improve internal environmental conditions of the property. (12)

ii. Alternatively in (a) above, air conditioning systems can be considered. Describe how the all-air central air conditioning system works. (10)

[30]

SECTION B

Question 3

(a) Justify the provision of bedding in underground drainage pipe laying. (5)

(b) 'Mixing of waste water and storm water in combined sewer systems is fundamentally irrational. It is the consequence of historical accidents and remains a cause of significant damage to the water environment'. Discuss (15)

[20]

Question 4

(a) Critique the use of a refuse chute as a means of disposing solid waste in tall buildings. (12)

(b) Explain the following ways of dealing with solid waste, relating their application to the City of Bulawayo:

i. Land filling (4)

ii. Recycling (4)

[20]

Question 5

(a) Describe the usual causes to loss of seals in traps and counter solutions to minimize such occurrences. (12)

(b) By use of the discharge unit value method, find the diameter of the vertical stack to take the discharges from the following sanitary fittings in a 10 storey office block: 120 WCs;120 basins; 20 sinks and 40 tubs. Use the tablesbelow for your calculations. (8)

[20]

Table 1

Type of sanitary fitting	**Discharge units**
Automatic washing machine	35
WC	12
Washing basin	3
Sink	15
Bath tub	50
Shower	25

Table 2: Maximum number of discharge units to be allowed on vertical stacks per given usage.

Normal internal diameter of pipe	**Discharge**
75mm	200
90mm	350
100mm	750
125mm	2500
150mm	5200