



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

BUILDING SERVICES II

AAR 3203

Examination Paper

May 2017

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: Muvungani R.

INSTRUCTIONS

1. Answer any **four** questions
2. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

QUESTION ONE

- a. Explain green architecture, providing the green design characteristics [10]
- b. Discuss strategies that can be used to promote green buildings in relation to water usage [15]

QUESTION TWO

- a. Differentiate room acoustics from building acoustics [4]
- b. Explain passive and active acoustics [6]
- c. Mechanical ventilation systems are frequently applied to various buildings, where the air change requirements are important for health and welfare provision. Discuss three mechanical ventilation systems with examples of buildings where they are best suited. [15]

QUESTION THREE

- a. Justify the need of the following processes in a conventional sewage treatment plant.
 - i. Influent blowing [2]
 - ii. Screening [2]
 - iii. Grit removal [2]
 - iv. Biological filtration [2]
 - v. Effluent dosage [2]
- b. Explain treatment of sewage using stabilization ponds system. [15]

QUESTION FOUR

- a. Explain the effects of poor solid waste management, with reference to actual cases in Zimbabwean cities /communities [10]
- b. Discuss factors that influence the selection of the most appropriate HVAC system for a building [15]

QUESTION FIVE

- a. Given below is information that was gathered pertaining to a particular building.

Lighting flash density (N_g) = 4; Relative structural location (C_1) = 0.5

Rectangular structure size = 50m \times 40m \times 30m

Structural coefficient (C_2) = 1.0,

Structural content coefficient (C_3) = 2.0

Structural occupancy coefficient (C_4) = 3.0

Lightning consequence coefficient (C_5) = 5.0

Assess the need to protect the building from lightning strikes using the information furnished above [15]

- b. The same building has got the following appliances: 120 WCs with 9 liters flush, 120 basins, 20 sinks and 40 tubs. By use of the discharge unit value method, find the diameter of the vertical stack to take the discharges from the sanitary appliances. Use the tables below for your calculations.

Table 1: Discharge units per appliance

Type of sanitary fitting	Discharge units
Automatic washing machine	4
WC (9 ltr cistern)	15
Washing basin	3
Sink	15
Bath	7
Shower	0.1
Urinal stall	0.3

Table 2: Maximum discharge to be allowed on vertical stacks.

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

[10]