NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

BACHELOR OF ARCHITECTURE (HONOURS) DEGREE

2012-2013 ACADEMIC YEAR

PART 111 – SECOND SEMESTER EXAMINATIONS – MAY 2013

AAR 3203 – BUILDING SERVICES 11

Instructions ***Time: 3 hours***

Choose any four questions.

QUESTION ONE

a) Discuss any four (4) sewage treatment options to a large-scale treatment plant, highlighting circumstances where each would be most ideal. (20)

b) What advice would you give to the municipality of an upcoming town area in relation to the most appropriate location of their proposed new treatment plant? (5)

[25]

QUESTION TWO

a) You are furnished with the following information in relation to lightning assessment variables of a particular building:

- Lightning flash density in the area (Ng) = 4
- Relative structural location (C1) = 2
- The building is a rectangular structure of dimensions: L = 80, W = 50, & H = 30m
- Lightning strike frequency (Nd) = 5.93
- Structural coefficient (C2) = 4
- Structural contents coefficient (C3) = 3
- Structural occupancy coefficient (C4) = 3
- Lightning consequence coefficient (C5) = 2.

Using the given information, carry out a lightning risk assessment to determine whether the building should be protected or not. (13)

b) Explain any two (2) lightning protection systems that you can recommend where there is need to protect a building. (12)

[25]

QUESTION THREE

a) "The function of a well-designed soil and waste discharge system in a building is to efficiently take away all waste from sanitary fitments to the main drains, without allowing foul air to enter the building via the sanitation pipe work system."
In light of the statement in quotes which drainage system would you consider most appropriate for a three storey hostel building with a whole range of fittings closely spaced on all floors of the building? (13)

b) Outline the usual causes to loss of seals in traps and recommendations that you can give in a bid to minimize such occurrences. (12)

[25]

QUESTION FOUR

a) What are the general requirements for good acoustics for any given enclosed space? (5)

b) Give a brief discussion on the materials and methods that can be used to control the quality of sound in buildings. (15)

c) A hall with a reverberation time of 1.2 seconds has the following dimensions:
Length = 80m
Width = 20m
Height = 25m
Calculate the amount of extra absorption required to obtain a reverberation time of 1 second. (5)

[25]

QUESTION FIVE

a) Outline the main objectives of ventilating a building. (5)

b) Natural ventilation is an economic means of providing air changes in a building and makes use of components integral with construction. Shed more light on how designers can maximize the occurrence of natural ventilation. (8)

c) Mechanical ventilation systems are frequently applied to commercial buildings, workshops, factories, etc., where the air change requirements are defined for health and welfare provision.
Discuss these systems with the aid of sketches. (12)

[25]

END