NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART III FIRST SEMESTER EXAMINATIONS – JANUARY 2004
AAR 3103 – BUILDING SERVICES I

Instructions *Time : 3 Hours*

Answer ANY FOUR Questions.

QUESTION 1

a) Discuss briefly the steps involved in choosing the source of water supply. [8]

b) Pure water should have a low solid matter content. Explain how the solid content in water can be assessed and reduced if found to be high. [9]

c) Discuss how wholesome water can be supplied from groundwater sources. [8]

QUESTION 2

a) Write brief notes on water storage cisterns. [8]

b) Discuss the plumbing system suitable for cold water supply to very tall buildings giving the merits and demerits associated with this system. [9]

c) Explain in brief back siphionage and possible ways to avoid it. [8]

QUESTION 3

a) Discuss possible ways in which hot water can be supplied in a building where draw off points are far apart (more than 8 m apart). [14]

b) Write notes on problems associated with hardness of water in hot water supply. [11]

QUESTION 4

a) Discuss steps involved in geyser location within a building. [8]

b) Calculate the capacity of a geyser and cold water storage cistern for a ten storey office block with canteen. The population is 75 persons on each floor. Use tables 2, 3 and 4 below for your calculations.

Table 2: Hot water storage for meal preparation

Number of main meals served	Storage in litres
50	455
100	568
200	682
300	909
400	1137
500 – 600	1364
700 – 800	1818
900 – 1000	2278
1000 and above	2841

Table 3: Hot water storage for ablution purposes.

Type of Building	Storage Per person litres
Dwelling houses & flats	45,5
Hostels	32
Hotels	35
Offices without Canteens	27
Offices with Canteen	35
Boarding Schools	23
Nurses' homes & Medical quarters	32

Table 4: Cold Water Storage

Type of Building	Storage per person (litres)
Dwelling house & flats	105
Hostels	105
Hotels	203
Offices without Canteens	42
Offices with Canteens	44
Boarding Schools	95
Nurses, homes and medical quarters	115

[17]

QUESTION 5

a) Discuss rainwater drainage on roofs and on ground around the building. [7]

b) Write brief notes on dual pipe system in soil – waste water removal from buildings. [5]

c) Design a septic tank to serve a population of 300 people. Assume the following factors.

i) Depth of septic tank is 1,5 m.

ii) Depth of filter is 1,8 m.

iii) Filter to be circular.

iv) Depth of humus tank 1m with a length of twice the breadth. [13]