

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 : 2 Hours

Answer ANY FOUR Questions.

QUESTION 1

- a) Discuss briefly steps involved in choosing the source of water supply. [8]
- b) Pure water should have 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 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 siphonage 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 3: 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

[9]

- c) Write brief notes on materials for hot water piping. [8]

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]