NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING
BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE
BACHELOR OF ARCHITECTURAL STUDIES
PART III FIRST SEMESTER EXAMINATIONS – DECEMBER 2002

BUILDING SERVICES 1 – AAR 3103

TIME: 3 Hours **TOTAL MARKS:** 100

INSTRUCTIONS:

Answer all questions

QUESTION 1

(a) One of the factors used in deciding choice of source of water is good quality while classification of water is wholesome, suspicious and dangerous. Give examples and reasons for such a classification paying attention to the quality of water and the degree of contamination.

(6 marks)

(b) Some of the requirements on water purity are softness and a low turbidity. Explain these two terms and write briefly on either how softness is achieved when water has both temporary and permanent hardness OR how the turbidity of water can be measured and lowered if found to be high.

(8 marks)

(c) i. What does the presence of E-coli bacteria show in water?

(1 mark)

ii. The process in which dangerous water is purified is generally through the following stages: removal of large particles by use of a grid, settlement and sedimentation of fairly small particles and finally chlorination. Explain briefly how very tiny particles (colloids) are removed during this process and also why it is necessary to chlorinate the water.

(5 marks)

(d) Answer d (i) or d (ii)

i. With the aid of a diagram describe how direct and indirect cold water supply can be implemented in supplying cold water to a building which is above 30m.

(10 marks)

ii. Explain in brief
- back siphonage

- advantages and disadvantages of indirect cold water supply over the direct cold water system.

(10 marks)

(e) With 80 mm; 100 m; 150 mm and 200mm size pipes available on the market, calculate the diameter of a water main to supply twenty-five 21 mm diameter short branch pipes.

(4 marks)

Total : 34 marks

QUESTION 2

(a) Answer (i) or (ii)
Write brief notes on (I) indirect hot water supply (10 marks)
(ii) Secondary piping system
in hot water supply giving its advantages over the dead leg system. (10 marks)

(b) Discuss problems associated with hardness of water in hot water supply.

(7 marks)

(c) Calculate the hot-water storage requirement for a factory having a total workforce of 981. The factory is to have a canteen kitchen, which will prepare main meals for all the workforce. Use the tables below for your calculations.

(8 marks)

TABLE 1: Hot-water storage required for restaurant and canteen kitchens for a 2hr recover period

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