

Assignment 01 – Water Supply Systems, Drainage and Sewage Disposal (2025-2026)

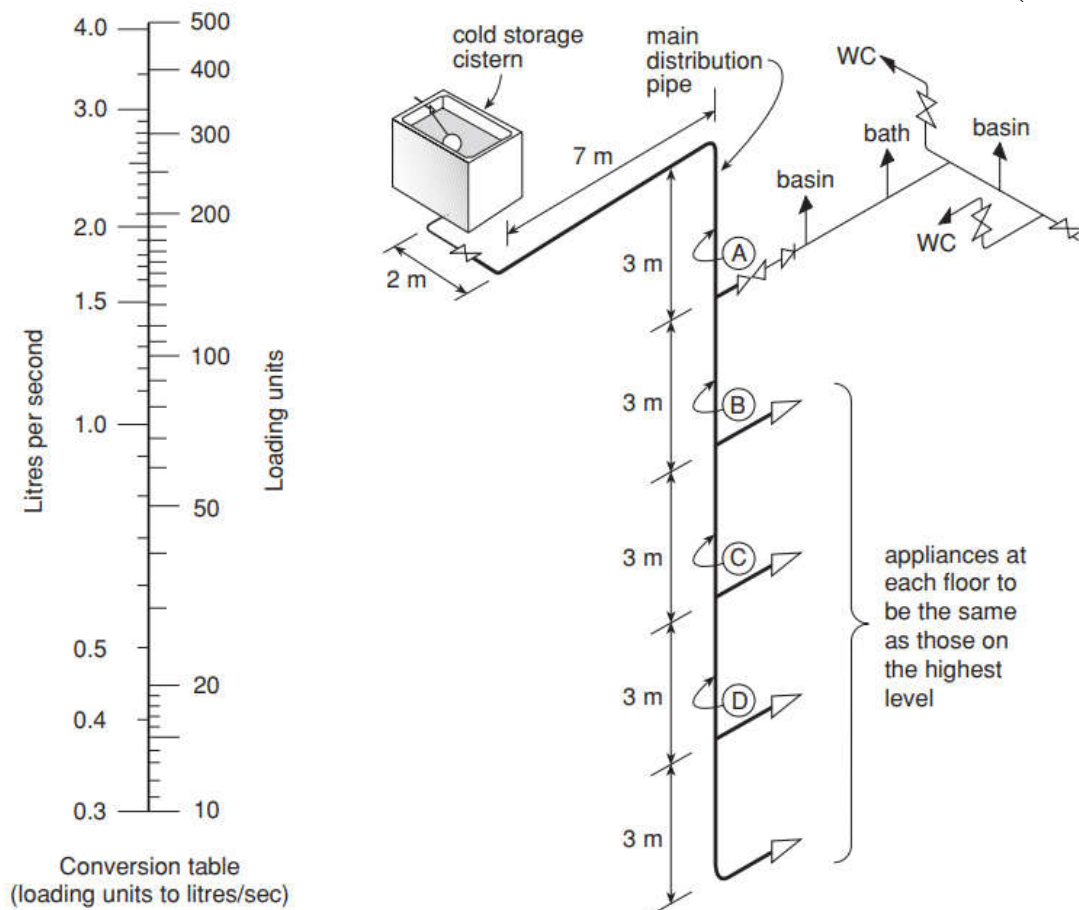
1. Cold and Hot Water Supply Systems

1.1 Briefly describe the different types of utilities buried underground in Hong Kong. Discuss the pros and cons of using urban utility tunnels.

(10 marks)

1.2 A cold water supply system is shown on the following figure. Determine the loading units and flow rate for the pipe sections A, B, C and D. Explain the principle and key factors of simultaneous demand used for the water supply piping system.

(10 marks)



1.3 Draw a simplified schematic diagram to show the typical arrangement and key

components of a cold water supply system for a multi-storey building, starting from the government water mains. Explain the maintenance responsibility for different parts of the water supply system.

(10 marks)

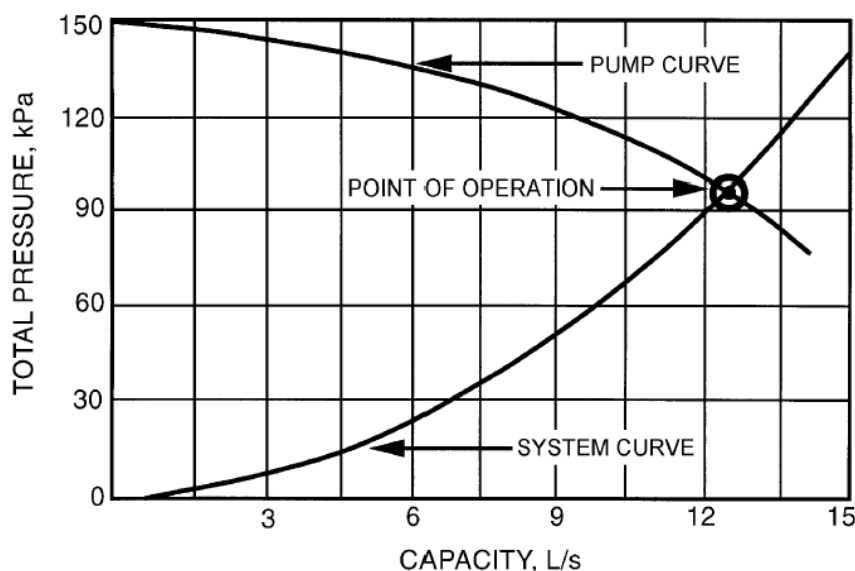
- 1.4 Briefly describe the outlook of the future water resources in Hong Kong. What are the five categories of water resources in Hong Kong? Discuss the possible methods to develop the new water supply sources.

(10 marks)

- 1.5 Explain the working principle and key components of a heat pump water heater. Illustrate with diagram(s). Briefly describe the technical requirements for non-centralised hot water systems applied in Hong Kong.

(10 marks)

- 1.6 A centrifugal pump is installed for a water supply system. The pump curve and system curve are shown in the figure below. Estimate the pump power requirement in Watts. Explain the meaning of self-priming for water pumps and describe how to achieve the self-priming.



Explain the meaning of water hammer and suggest measures to prevent its occurrence in water supply systems.

(10 marks)

2. Sanitation and Drainage

- 2.1 A uPVC drainage pipe of 225 mm diameter is flowing 0.5 proportional depth (half full bore). If the flow velocity is 1.0 m.s^{-1} , determine the minimum gradient using Chezy's formula. Briefly explain the statutory requirements for sizing vertical stormwater drainage stacks under the Building Ordinance of Hong Kong. Discuss the important technical considerations on velocities of flow for the stormwater drainage pipes.

(10 marks)

- 2.2 What are the basic important design parameters when determining the methods of sewage disposal? If connection to public sewers is not feasible for a building project due to far separation distance, briefly describe the sewage disposal methods which can be considered.

(10 marks)

3. Sewage Disposal

- 3.1 A vertical drainage stack pipe of diameter 100 mm has a water discharge from a branch pipe with a flow rate of 1.5 litre/s. Calculate the terminal velocity of the downward discharge flow and the terminal length below point of discharge entry. Discuss how the air pressure fluctuations in the drainage stack may affect the loss of water seal and the escape of the foul air. Illustrate with diagrams.

(10 marks)

- 3.2 Discuss and compare the three system types of sewage disposal for drainage below ground arrangement. Illustrate with diagrams.

(10 marks)