



JUNE XXXX

INTERMEDIATE LEVEL

Subject Title	PLUMBING NETWORK DRAWING
Subject Code No.	5455
Paper No.	TWO

Duration: 3 Hours

You are reminded of the necessity for good English and orderly presentation in your answers.

I - GENERAL PRESENTATION OF THE PROJECT:

The distribution plan of the appendix 1 (page 3 /6) is an extract from the upper floor plan of a proposed apartment storey building GF+4. Each floor level has several apartments. The objective of the present study is to design the plumbing networks of the four plumbing cells presented in appendix 2 (page 4/6). The plumbing cell is made up of :

- Two back to back kitchen of two adjacent apartments;
- Two back to back bathrooms of two adjacent apartments.

II – TECHNICAL SPECIFICATIONS

II – 1 – Technical Specifications for the skeletal framework:

- Height under ceiling : 2.80 m ;
- Bathroom window opening: 50 cm x 70 cm, height of window sill+1.50 m (from the finished floor level) ;
- Bathroom door opening: 70x220.
- Kitchen door opening : 90x220
- Lintel level :+2.20, this level is the same for all window and door openings
- Floor: upper decking floor (16+4) made of hollow decking blocks and a monolithic compression concrete slab of 4cm thick.
- Finished floor level of the ground floor: GF \pm 0.00.
- **NB:** All missing dimensions will be calculated on the basis of proportion from the graphic scale of the actual dimensions of the drawing.

II – 2 – Plumbing Fixtures

The plumbing fixture to be installed in each plumbing cell is given in the table 1. The dimensional and the hydraulic characteristics of each fixture are equally specified in the table 1.

Table 1

Plumbing space	S/N	Plumbing Fixtures	Dimensions (mm)	Rough-ins/ (m)		Drainage
				CW	HW	
Bathroom	01	Lavatory on pedestal	600 x 500	+0.55	+0.55	Under decking ceiling Ø 32
	02	Tank mounted WC	650 x 350	+0.70	/	Under decking ceiling Ø 100
	03	Shower tray	800 x 800	+1.10	+1.10	Under decking ceiling Ø 40
Kitchen	04	Kitchen sink	800 x 500	+0.60	+0.60	Under decking ceiling Ø 40
	05	Electric water heater	Ø 500	+1.80	+1.80	/

II – 3 – Plumbing Networks

II – 3 – 1 – Cold water distribution network

- The two toilet blocks are supplied from a cold water riser (label 3). The riser is in reticulated Polyethylene pipe (PER) of nominal diameter 32mm installed in the technical duct.
- The floor cold water supply pipe is equally in reticulated polyethylene pipe (PER) of nominal diameter 25mm and is situated at + 0. 25m above the finished level of the floor. The supply pipe is embedded into the masonry wall.
- The fixture supply pipe are executed in reticulated polyethylene pipe (PER) of nominal diameter 20mm and rough-in height is given in table 1.
- The outlets of the fixtures are in drop ear PER elbows, closed with GI plugs 20x1/2“.
- Apart of the general gate valve that commands each block, every fixture is provided with a gate valve which commands its isolation in case of necessity.

II – 3 – 2 – Hot water distribution network

- The production of domestic hot water to be use in the hotel is produced by an electric water heater located in the kitchen.
- The floor supply hot water supply pipe is in in reticulated Polyethylene pipe (PER) of nominal diameter 25mm. The supply pipe is situated at + 0. 30 above the finished floor level. The supply pipe is embedded in the masonry wall.
- The fixture supply pipe are executed in reticulated polyethylene pipe (PER) of nominal diameter 20mm and rough-in height is given in table 1.
- The outlets of the fixtures are in drop ear PER elbows, closed with GI plugs 20x1/2“.
- Apart of the general gate valve that commands each block, every fixture is provided with a gate valve which commands its isolation in case of necessity.

II – 3 – 3 – Domestic drainage Network:

The drainage network of the toilet block is made up of two separate drainage stacks; one for the soil water and the other for the waste water.

- The soil water branch drain is in PVC Ø 100. This branch drain evacuates soil water from the WC towards the soil water drainage stack (label 4) in PVC Ø 125. The soil water drainage stack is located in the technical duct.
- The waste water branch drain is in PVC Ø 63. This branch drain evacuates waste water from the other fixtures producing waste water towards the waste water drainage stack PVC Ø 100. The waste water drainage stack is located in the technical duct (label 3).
- The drainage slope of the branch drains is 2cm/m.

SECTION I- TRACING OF PLUMBING NETWORK

(30 marks)

On the appendix 2, trace the following plumbing networks of the toilet block:

- (a) Domestic cold water network (CW) (10 marks)
- (b) Domestic hot water network (HW) (10 marks)
- (c) Soil water drainage network (SW) (5 marks)
- (d) Waste water drainage network (WW) (5 mark)

NB: use the conventional color codes of fluid representation:

- Potable cold water: Blue,
- Domestic hot water: red
- Domestic waste: black

SECTION II- ISOMETRIC PROJECTION OF THE NETWORKS

(45 marks)

2.1 Draw by completing the isometric projection of the cold water and hot water distribution networks on appendix 3 to scale 1/20. Follow the orientation of the flow directions indicated on the drawing. The levels to be taken into consideration is from + 2.5m to +5.50m.

N.B.: indicate all the plumbing rough-in heights of the various plumbing fixtures and indicate their altitude in relationship to the finished floor level.

- Materialization of the networks: (2 x 10 = 20 marks)
- Line quality: (5 marks)
- Indication of altitudes of fixture's outlet: (5 marks)

2.2 Calculate the quantity of PER pipes (ml) and PER fittings (Unit) that will be needed to execute this installation, from the risers.

Considering a 20% for loss and damage. (15 marks)

SECTION III- SECTIONS AND DETAILS

(25 marks)

Using appropriate pencil grades (4H, 2H, H and HB) and instruments on the appendix 4 draw the cross section AA on a drawing paper A4V and to a drawing scale of 1/20. The levels includes; + 2.5m to+5.50m. Indicate all pipelines, fixtures that appear behind the cutting plane. Indicate all vertical dimension and altitudes on the section.

N.B.: The section A-A is limited only to the bathroom. (25 marks)

The End

