CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and Vocational Education Examinations

JUNE XXXX **ADVANCED LEVEL**

Specialty Name (Specialty Code)	**PLUMBING HYDRAULICS AND SANITARY INSTALLATION (PHIS)**
Subject Title	**PLUMBING DRAWING**
Paper No.	**2**
Subject Code No.	**7455**

Three hours

INSTRUCTIONS TO CANDIDATES

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

You are advised to read carefully through the question paper, before you begin your answers.

I- ARCHITECTURAL DESCRIPTION OF THE PROJECT

The appendix 1 drawn to scale 1/20, is the plumbing plan in a residential building duplex, of the proposed building project of Mme. Tifuh, to be constructed in the Molyko new layout estate. The present plumbing plan is that of the plumbing block situated at the ground floor, made up of the visitor's bathroom and the kitchen. This block is identical to the plumbing block of the upper floor made up of two bathrooms of the sleeping rooms.

II- PLUMBING FIXTURES SPECIFICATIONS

The table 1 gives the different plumbing fixtures and accessories to be installed in the different plumbing spaces.

Space	Plumbing fixtures	Dimensions	Rough-ins CW/HW	Drainage	Faucet
Bathroom	Acrylic Bathtub	1500x700x450	+0.700	Fixture trap ϕ 40	Wall mounted Mixer
	Pedestal mounted Lavatory	590x490	+0.525	Fixture trap ϕ 32	Mixing valve
	WC	680 x340 x 840	+0.700	Fixture trap ϕ 100	-
	Ariston electric hot water heater (80l)	Φ450x800	+1.750	Indirect connection to a floor drain ϕ32	T/P relief valve
Kitchen	Stainless steel sink	1200x 500	+1.100	Fixture trap ϕ 40	Mixing valve

III- INSTALLATION OF PLUMBING FIXTURES

In function of the plumbing plan of appendix 1, the plumbing fixtures will be installed following the axis positions given in the table 2

Plumbing Fixtures	Position of axis
Pedestal lavatory	1
Water closet	2
Bath tub	3
Kitchen stainless steel sink	4
Floor drain 100x100 ϕ32	5
Electric hot water heater	6

IV- PIPING NETWORKS

4.1 COLD AND HOT WATER DISTRIBUTION NETWORKS

The cold water service pipe which supplies the plumbing block is in PE pipe of nominal diameter 25. This service pipe is buried beneath the slab on grade of the ground floor at a level situated at -0.600m. The riser which supplies the block is connected to the service pipe by an appropriate adaptor (PE-PEr). The riser is in reticulated PE pipe and is apparent and mounted against the masonry walls with pipe clips placed at 500mm c/c. The assembling joints are executed in poly fusion welding. The cold water supply pipe is located at +0.250 m above the finished floor level. The plumbing rough-ins dimensions are given in the table 1. The plumbing fixtures are connected to their respective faucet's outlets by flexible FF tube of 15/21. All outlets are in drop ear internal threaded PE elbows and closed with GI plugs to prevent intrusion of foreign matter and testing.

The hot water pipeline has the same characteristics as the cold water pipeline. Hot is water produced in the electric hot water located in the kitchen. This pipe is located at +0.300 m above the finished floor level at the Ground floor. The hot water service pipe is protected with insulating tape to prevent heat loss. The two pipelines are perfectly horizontal and at different points of intersections, factory manufactured cross over fittings are used.

3.2 DRAINAGE NETWORK

The domestic waste water drainage network of the block is unique into two distinct stades(DS1 and DS2) in PVC ϕ 100 and the waste water drain in PVC ϕ 63. These stacks are located in the technical duct in the bathroom. The soil and waste water stacks are reduced to ϕ 63, at the upper floor level to create the primary vent stack. The end of the vent stack is provided with an aerator to regulate the admission of air and evacuation of sewage gases. All branch connections either in the horizontal or vertical positions are executed in Y-off set 45° branch with 1/8 elbows. The drainage network is supported by pipe clips and concealed under the hanging ceiling with POP boards. .

IV WORK REQUIRE

4.1 On appendix 1, showing the plumbing plan of the bathroom, drawn to scale 1/20 and using the orientation of the direction of flow given, materialize all the different types of plumbing network, using the standard color coding:

- Cold water: blue;
- Hot water; red,
- Drainage: black. **(24 marks)**

4.2 Complete on appendix 2, drawn to scale 1/20, draw the isometric drawing of the cold and hot water distribution networks. Indicate on the drawing the plumbing rough –in altitudes of fixtures. **(24 marks)**

4.3 On A3V drawing paper format, using the appropriate pencil grades and instruments; the section A-A starting from the level –3.100 (foundation level) and +2.800 (roof beam level). The following complementary information is given:

- Openings; doors D1 700 x 2250;
- Openings; Windows W5 800x 700;
- Window sill level for W5 ; + 1.550;
- Lintel level; +2250.
- All walls are load bearing masonry with cement blocks of 150x200x400
- Main beams supporting upper basement decking: 150x 400;
- Tie beams on the ground floor level; 150x200
- Upper basement decking; floor slab, thickness 140mm. **(32 marks)**

4.4 Using the outline isometric drawing of appendix 1, draw a symbolic free hand drawing of the drainage network, represent the horizontal branch drain (collector), vertical drainage stack and the secondary vent pipe. **(20 marks)**