



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLUMBING THEORY N2

11 August 2023

This marking guideline consists of 6 pages.

QUESTION 1: COLD WATER SUPPLY

- 1.1
- Water in which soap does not lather well but gives off a greyish scum.
 - Hard water is healthy for humans.
 - Hard water reacts very negatively to pipes and boiling systems where water is used.
- (3)
- 1.2
- To conserve soap✓
 - To improve the quality of water✓
 - To improve the taste and odour of water✓
- (3)
- 1.3
- Collection from a source such as a river or a valley at the foot of a mountain range.
 - Sedimentation by adding a coagulant to get rid of colloidal matter.
 - Filtration to pass water through a series of filtering media to clean it.
 - Storing the water for consumer consumption.
- (4)
- 1.4
- Injection aeration:✓ perforated pipes, diffusers, airlift pumps and other patent devices.✓
 - Gravity aerators:✓ inclined planes, cascades, perforated traps.✓
 - Pressure sprays or fountain aerators, orifices, and nozzles.✓ (Any 2 × 2)
- (4)
- 1.5
- Advantages:**
- The pillar-type fire hydrant is easy to locate.
 - It is easy to operate in a standing position due to its height.
- (2)
- Disadvantages:**
- It can be in the way of pedestrians.
 - Moving objects can damage them.
- (2)
- 1.6
- True,✓ a push-through geyser is used where a kitchen sink or wash basin has been installed and only small amounts of hot water are required at a time.✓
- (2)

[20]

QUESTION 2: HOT WATER SUPPLY

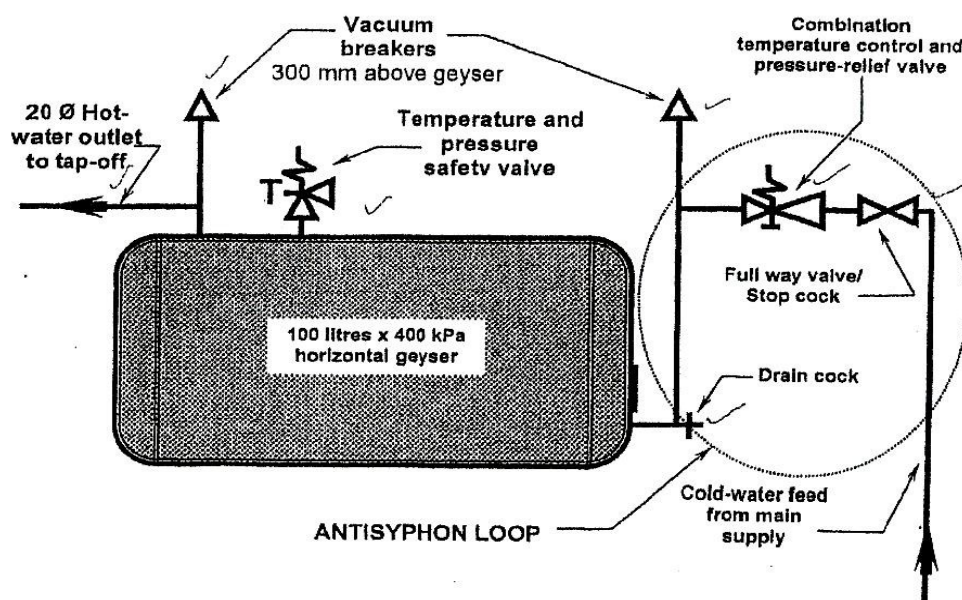
- 2.1 In a system where a pressure-reducing valve is used, no supply tank is needed. ✓ Water is supplied directly from the mains via pressure reducing valve, which is usually situated outside the dwelling in case of any problem due to malfunctioning. ✓ The level of water in the outlet pipe balances the pressure at the valve and as soon as the draw-off point is opened the level drops ✓ and the pressure valve opens, trying to maintain the level in the outlet pipe. ✓ When the tap is closed again, the water rises in the outlet, ✓ equalising the set pressure at the valve and so closing the valve as well. ✓ Clockwise adjustment of the screw increases the flow and anticlockwise adjustment reduces pressure. ✓ To obtain the right pressure, the screw is turned clockwise until the water just starts flowing from the overflow ✓ and it is then turned one full turn anticlockwise. (8)

- 2.2 **Advantages:**
- A separate tank is required thus saving on pipes and fittings.
 - There are seldom problems with air locks when it is used in single flat.
 - It provides satisfactory pressure at the hot water taps as it is a gravity-type geyser.
- (Any 2 × 1) (2)

Disadvantages:

- More electricity is used because heat rises up into the supply tank and escapes.
 - If it is installed below the ceiling, the damp air in the vicinity of the tank causes the paint to peel from the wall and ceiling.
- (2 × 1) (2)

2.3

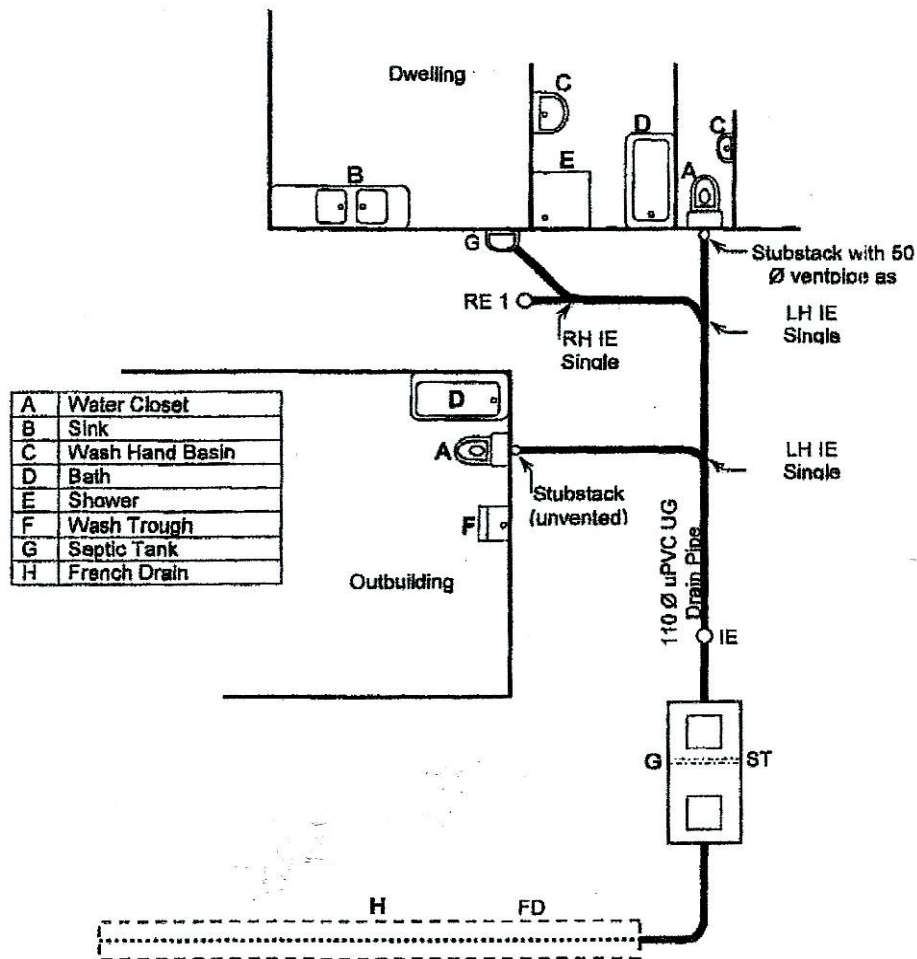


Correctness	3
Labelling	2
Valve position	3
TOTAL	8

(8)
[20]

QUESTION 3: DRAINAGE

3.1



(15)

3.2 Fall over 13 m
 $= 13 \times \frac{1}{4}\%$
 $= 0,325 \text{ m}$

(2)

Invert depth at the next change
 $= 0,66 + 0,325$
 $= 0,985 \text{ m}$

(2)

- 3.3
- Ventilation pipe allows smell gasses to escape from the drainage installation at a safe height into the atmosphere.
 - They prevent gasses from accumulating in the drains and sanitary pipes.
 - They act as anti-syphonage provisions.

(3)

- 3.4
- 3.4.1 Wash basin
 - 3.4.2 Septic tank
 - 3.4.3 Manhole
 - 3.4.4 Bath
 - 3.4.5 Copper

(5 × 1)

(5)

3.5 The activated sludge can be defined as a suspension of micro-organisms, both active and dead, ✓ in wastewater consisting of entrapped and suspended colloidal ✓ and dissolved organic and inorganic materials. ✓ (3)

3.5 **Advantages:**

- Waste pipes smaller than 50 mm can be used.
 - Ordinary standard waste traps can be used.
 - Sewer gas cannot penetrate the building as waste pipes are kept separated and discharged over the gully.
- (Any 2 × 1) (2)

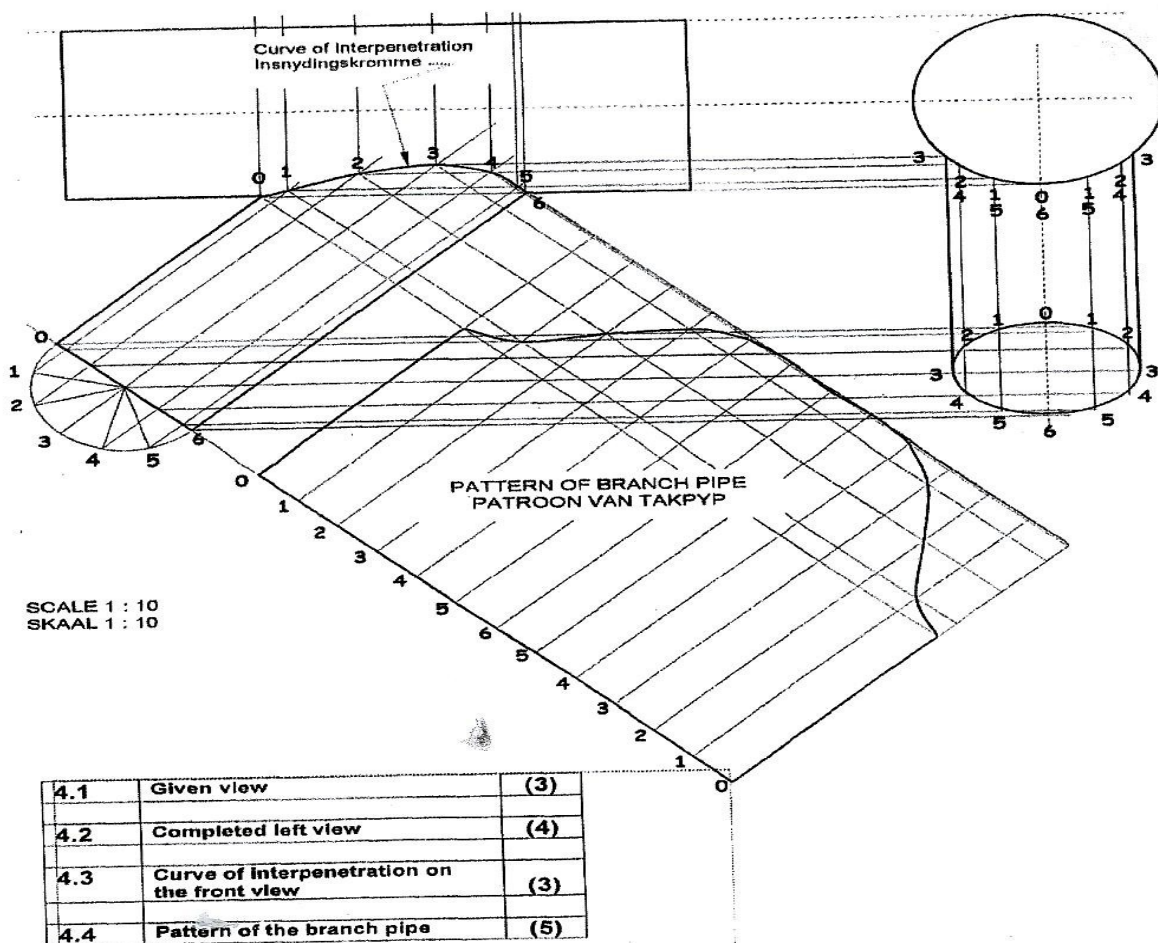
Disadvantages:

- Installation and material costs are high due to extra labour.
- The pipe arrangements are complicated.
- More vents pipes and anti-siphon pipes are projecting through the roof.

(Any 2 × 1) (2)

3.7 A drain is a primary vessel or conduit for unwanted water or waste liquids to be flumed away into the sewers or storm water mains. (1)
[35]

QUESTION 4: SHEET-METAL WORK AND FLASHING



[15]

QUESTION 5: CALCULATIONS

- 5.1.1 The volume of water
= length × width × height
= 1 400 × 1 800 × 1 900 ✓
= 1,4 × 1,8 × 1,9 ✓
= 4,788 m³ ✓ (3)
- 5.1.2 Mass of water
= density × volume ✓
= 1 000 × 4,788 ✓
= 4 788 kg ✓ (3)
- 5.1.3 Area of the material
= 2(short sides) + 2(long sides) + (base)
= 2(1,4 × 1,9) + 2(1,8 × 1,9) + (1,4 × 1,8) ✓
= 2(2,66) + 2(3,42) + (2,52) ✓
= 5,32 + 6,84 + 2,52 ✓
= 14,68 m² ✓ (4)

[10]**TOTAL: 100**