higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLUMBING THEORY N2

1 AUGUST 2018

This marking guideline consists of 7 pages.

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QUESTION 1: COLD-WATER SUPPLY

1.1 1.1.1 Sterilisation is the addition of chlorine to the water✓ to make the water free from harmful bacteria so as to be used for human consumption.✓

1.1.2 Pressure zone is a division of the reticulation network of a suburb✓ where the water is supplied from a certain reservoir serving a particular area.✓

1.1.3 Filtration is the process in water purification that removes bacteria✓ and finely divided clay and colloidal matter smaller than the openings between the sand grains, through layers of sand.✓ (6)

1.2
- Colourless
- Tasteless
- Odourless
- Clear and sparkling
- Free of germ (Any 4 × 1) (4)

1.3 Water hammer is the noise heard when taps were sudden closed, air trapped in the pipeline✓ or sometimes due to pipes that are not properly saddled to the wall.✓ (2)

1.4
- Failure to fit supply pipes properly to ceiling joists or other fixtures that support the pipes.
- Connecting primary flow pipes and primary return pipes the wrong way round.
- Closing a tap or a valve too quickly, produces a shock wave through the pipe and causes vibrations, if the pipe is not fitted properly.
- Lime deposits in the pipe system restrict the water flow especially in gravity type or combination type hot-water systems and faulty washers, especially in a higher pressure installation. (Any 3 × 1) (3)

1.5
- Close all taps slowly and gently.
- Fit an air-release valve at the top of the water supply system.
- Install a water hammer arrestor.
- Do not use long pipe runs.
- Secure any long pipe runs to the rafters or the walls using plastic pipe clips as supports. (Any 3 × 1) (3)

1.6
- Air in the water pipeline can lead to an increase of burst pipes especially FC pipes.
- It causes discomfort to the consumers due to spluttering of the water when a cold-water tap is opened.
- When the air mixes with the water under pressure, it gives the water a milky appearance and this can influence the taste.

(Any 2 × 1) (2)

[20]

QUESTION 2: HOT-WATER SUPPLY

2.1
- Yellow
- Orange
- Blue
- Black (4)

2.2
- It reduces the incoming mains pressure to a prescribed pressure rating.
- It maintains or controls this pressure when the system is not in use.

(Any other correct explanation) (2)

2.3 **ADVANTAGES**
- It has a simple design.
- It has low maintenance cost.
- It is easier to install than other geysers.
- It does not require an expansion pipe through the roof.
- It does not need an extra supply tank.
- It is cheaper than other geysers.
- It does not take up a lot of space. (Any 2 × 1) (2)

DISADVANTAGES
- The water pressure is quite low because of the height limit.
- The water flow can be slow, because of the low pressure.
- There is very little reserve water in the tank.
- Modern mixers cannot be used as the water pressure is too low.
- Airlocks can occur in the hot-water pipes. (Any 2 × 1) (2)

2.4 It is to feed the geyser with water at an acceptable pressure. (1)

2.5 Both supply tank and pressure-control valve, control the pressure of water to an acceptable pressure rating to the geyser✓ and therefore they cannot be used at the same time.✓ (2)

2.6
- Latitude
- Orientation
- Vapour
- The time of day
- The season
- The atmospheric condition (atmosphere) (Any 4x1) (4)

2.7
- The system is not very effective in periods when there is no direct sunlight
- It is a costly installation
- It can be unsightly on the roof tops
- Adds extra weight load to the roof structure (Any 3x1) (3)

[20]

QUESTION 3: DRAINAGE

3.1
- A drain should be laid according to the approved plan.
- Alignment must be true.
- The invert depth should be correct.
- The drain should have an effective self-cleaning gradient.
- The soil cover should be at least 300 mm.
- Sufficient access shall be provided.
- The drain must be supported and protected with concrete where necessary.
- The drain must be laid on a solid base.
- Rodding eyes and gullies must be properly compacted and supported.
- Also ensure that the installation is covered in accordance with the regulation. (Any 5 × 1) (5)

3.2
- Each test hole shall have a diameter of approximately 150 mm and
- shall have a depth of approximately 400 mm.
- Thoroughly scarify the sides and
- bottom of each test hole with a sharp pointed instrument.
- Remove all the loose material from the test holes.
- Line each test hole with a polyester filter fabric and cover its bottom with a 50 mm layer of pea coal.
- Fill the test hole with water to a depth of 300 mm.
- Measure the percolation rate as prescribed in SABS 0250-2 (7.3.2.5).

(Any 6 x 1) (6)

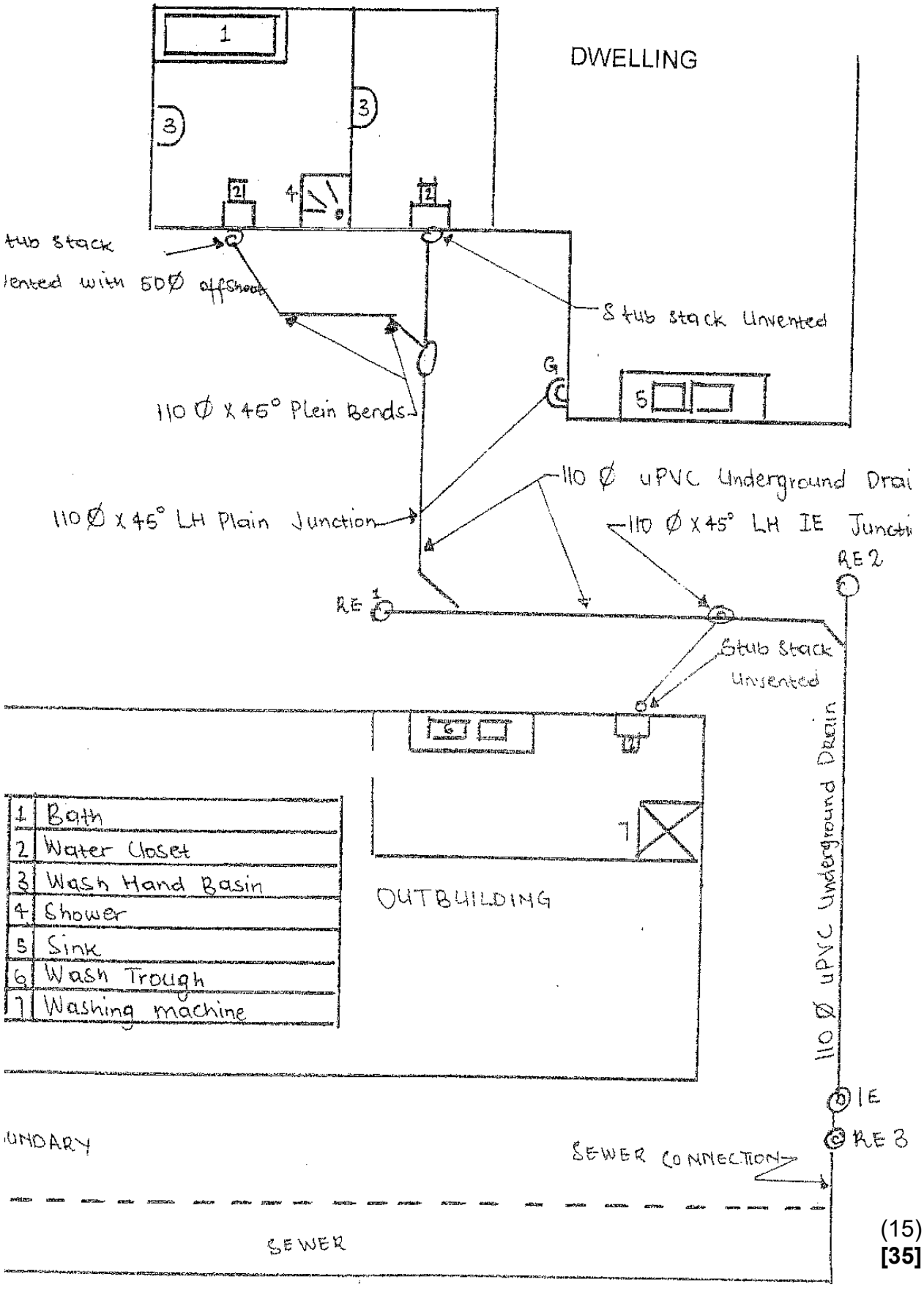
3.3
- The organic matter is fermented and
- decomposed by the action of aerobic bacteria, microorganisms, maggots and worms and
- settle to the bottom of the tank as a sludge.
- Fats and grease that are not retained in the grease trap, are also collected in the scum layer and usually remain there. (4)

3.4
3.4.1 Water meter
3.4.2 Septic tank
3.4.3 Shower
3.4.4 Cleaning eye
3.4.5 Manhole

(5 × 1) (5)

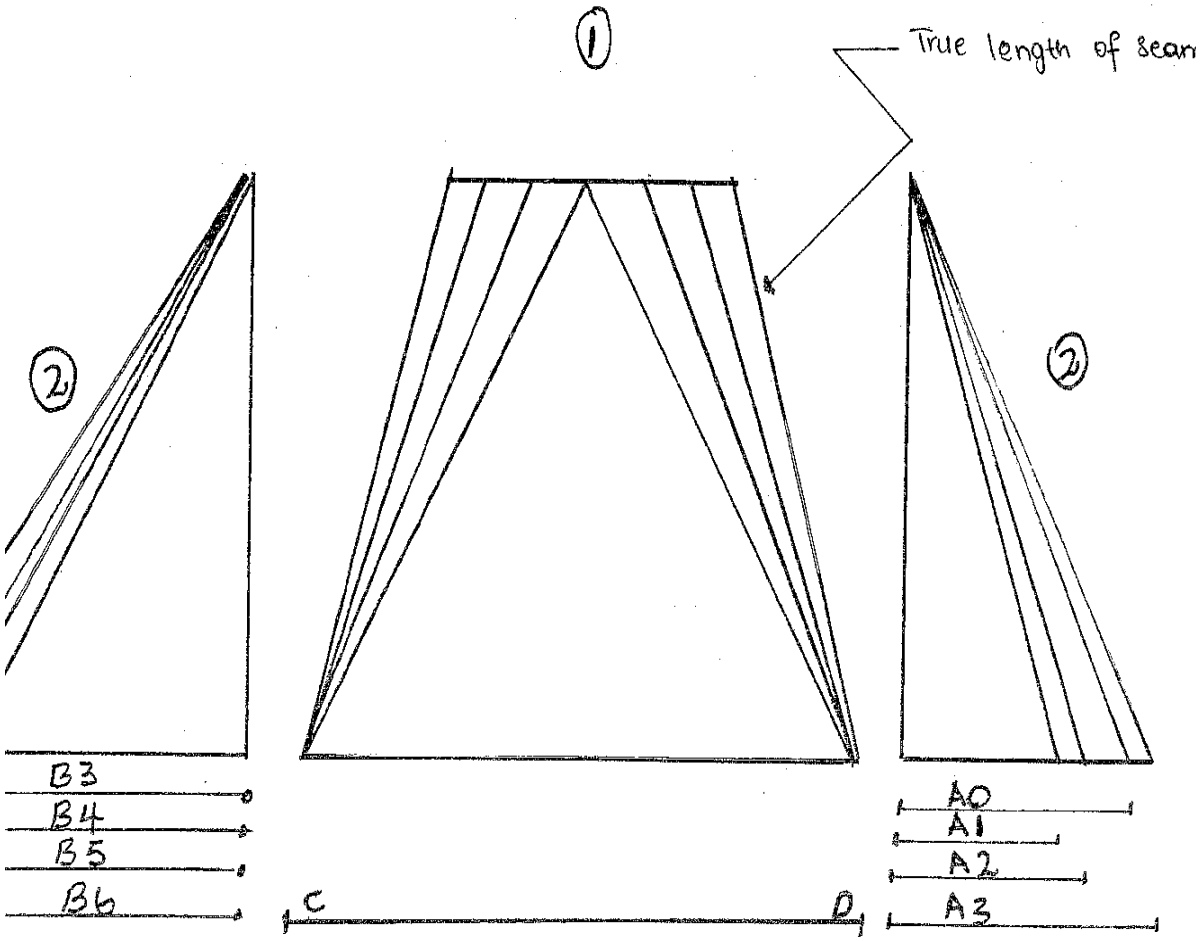
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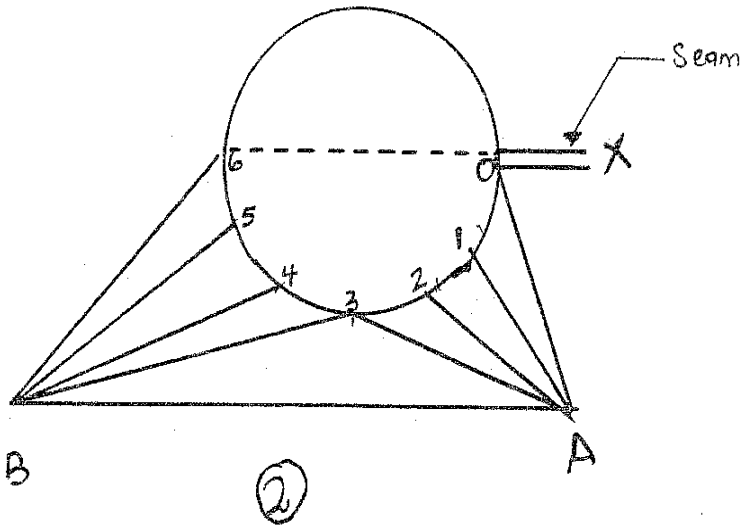
3.5 **(DIAGRAM SHEET 1)**



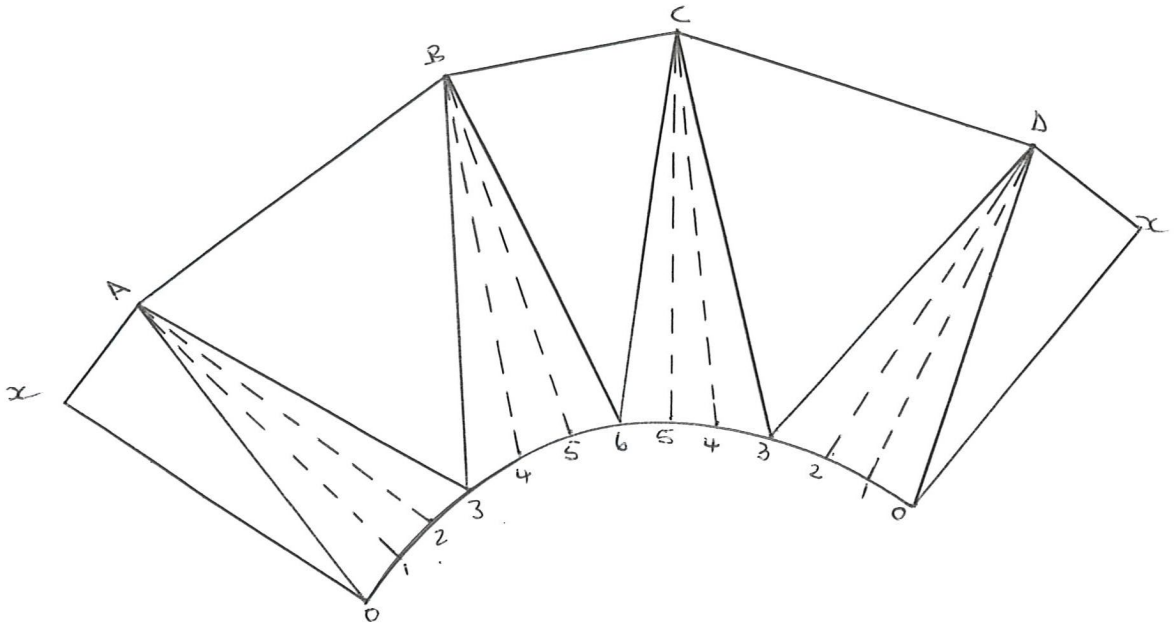
(15)
[35]

QUESTION 4: SHEET METAL WORK AND FLASHING





QUESTION 4: Continued



Arc	2
Line quality	1
Base lines	4
Neatness	1

TOTAL: 7 + 8 = 15 **[15]**

QUESTION 5: CALCULATIONS

DESCRIPTION	QUANTITY
22 mm copper pipe class 460/2	4 m – 5 m
1,5 mm pipe class 460/2	0,4 m – 1 m
22 mm – 600 kPa combination pressure-control and pressure-relieve valve	1
150 litres × 600 kPa geyser complete with TP valve and drain cock	1
22 mm stop cock	2
22 mm vacuum breaker	2
22 mm full-way valve	1
15 mm full-way valve	2
22 mm equal T-piece	7
22 × 22 × 15 T-piece	3
22 × 15 × 15 T-piece	2
22 × 15 × 22 T-piece	1
Award 1 x 10 marks for correct description / quantities. Additional responses can be accepted.	

[10]

TOTAL: 100

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