



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLUMBING THEORY N1

31 JULY 2018

This marking guideline consists of 7 pages.

QUESTION 1: SAFETY AND HOUSEKEEPING

- | | | | | |
|-----|-------|-----------------|---------|-----|
| 1.1 | 1.1.1 | CO ₂ | | |
| | 1.1.2 | Foam | | |
| | 1.1.3 | Water | | |
| | | | (3 × 1) | (3) |
- 1.2 A minimum of 75 mm✓ and a maximum of 200 mm.✓ (2)
- [5]**

QUESTION 2: TOOLS AND MACHINE

- 2.1 Guillotine (1)
- Safety measures:
- Finger guard should be provided for the blade
 - Machine should be tightly secured to the floor
 - Moving parts should be well oiled
- (Any 2 × 1) (2)
- 2.2 • prohibition signs✓ – circular shape✓
 • mandatory signs✓ – circular shape✓
 • warning signs✓ – triangular shape✓
 • information signs – square oblong✓
 • fire signs✓ – square or triangular or rectangular✓ (8)
- [11]**

QUESTION 3: METALS AND MATERIALS

- 3.1 It is made of copper✓ and it is malleable,✓ ductile✓ and conductive.✓ (4)
- 3.2 • galvanising
 • paint
 • bitumen
 • enamelled iron (4)
- [8]**

QUESTION 4: SOLDERING AND WELDING

- 4.1 Gas welding:
- Gas cylinders (acetylene and oxygen)
 - Regulators
 - Rubber hoses
 - Mixer (blow pipe and nozzle)
 - Welding rods
 - Flash back arrestor
- Arc welding:
- Electrode holder
 - Earth clamp
 - Welding machine
 - Electrodes
- (Any 2 × 4) (8)
- 4.2
- The high pressure system
 - The medium- pressure system
 - The low-pressure system
- (3)
[11]

QUESTION 5: COLD WATER SUPPLY

- 5.1 5.1.1 pillar tap (1)
- 5.1.2 bath/hand wash basin (1)
- 5.1.3
- | | | |
|---|-----------------------|-----|
| 1 | packing gland nut | |
| 2 | packing | |
| 3 | jumper or valve plate | |
| 4 | washer | (4) |
- 5.2
- Safe to drink
 - Attractive in appearance (sparkling)
 - Free of taste
 - Free of odour
 - Usable in a variety of household and industrial purposes. (Any 3 × 1) (3)
- 5.3 Water hammer refers to the incessant knocking^v and vibrating sound in pipework. (2)
- 5.4 5.4.1 Portion of pipe from service mains to behind the meter
- 5.4.2 Portion of pipe between meter and premises
- 5.4.3 Pipe from service mains to the premises
- (3 × 1) (3)
[14]

QUESTION 6: HOT WATER SUPPLY

- 6.1 Advantages
- It takes up little space
 - It reduces labour and material costs
 - The valve is easily accessible for repairs
- Disadvantages
- It is very expensive when faulty
 - It malfunctions when grains of sand filters through the system.
 - Those made of plastic can easily break when not handled with care.
- (Any 2 × 2) (4)
- 6.2
- To lay pipe underground, deep enough or below frozen ground surface.
 - To put a layer of lagging around the pipe.
 - Lay pipes in cavity walls.
- (Any 2 × 1) (2)
- 6.3 By the sun✓ (1)
- 6.4 This geyser has a built in cold water storage tank which is automatically controlled by a ball valve with supply coming directly from the mains✓ and the supply pipe delivers cold water into the cylinder for heating by the element.✓ When the water is hot enough as per the setting on the thermostat it then supplies hot water to draw-off points.✓ (3)
- 6.5 Advantages:
- A decrease in electricity consumption is more environmentally friendly
 - Solar (sun) energy is used to heat the water
- Disadvantages:
- Not very affective in periods of no direct sunlight-(cloudy periods)
 - Costly installation.
 - Unsightly on roofs.
 - Added weight to roof structure.
- (Any 2 × 1) (2)
- [12]**

QUESTION 7: DRAINAGE

- 7.1
- Close-coupled suite
 - The low-level suite
 - The high-level suite
- (3)
- 7.2 The water closet (toilet) pan has a built-in water seal trap✓ and will therefore not need to be fitted with a water seal trap.✓ (2)
- 7.3 It is the principle of connecting the individual water seal traps,✓ from a sanitary fixture, to a ventilated drain✓ or other ventilated pipe which leads into the open air.✓ (3)

- 7.4 7.4.1 Anti-siphon pipe
 7.4.2 Bidet
 7.4.3 French drain
 7.4.4 Gully

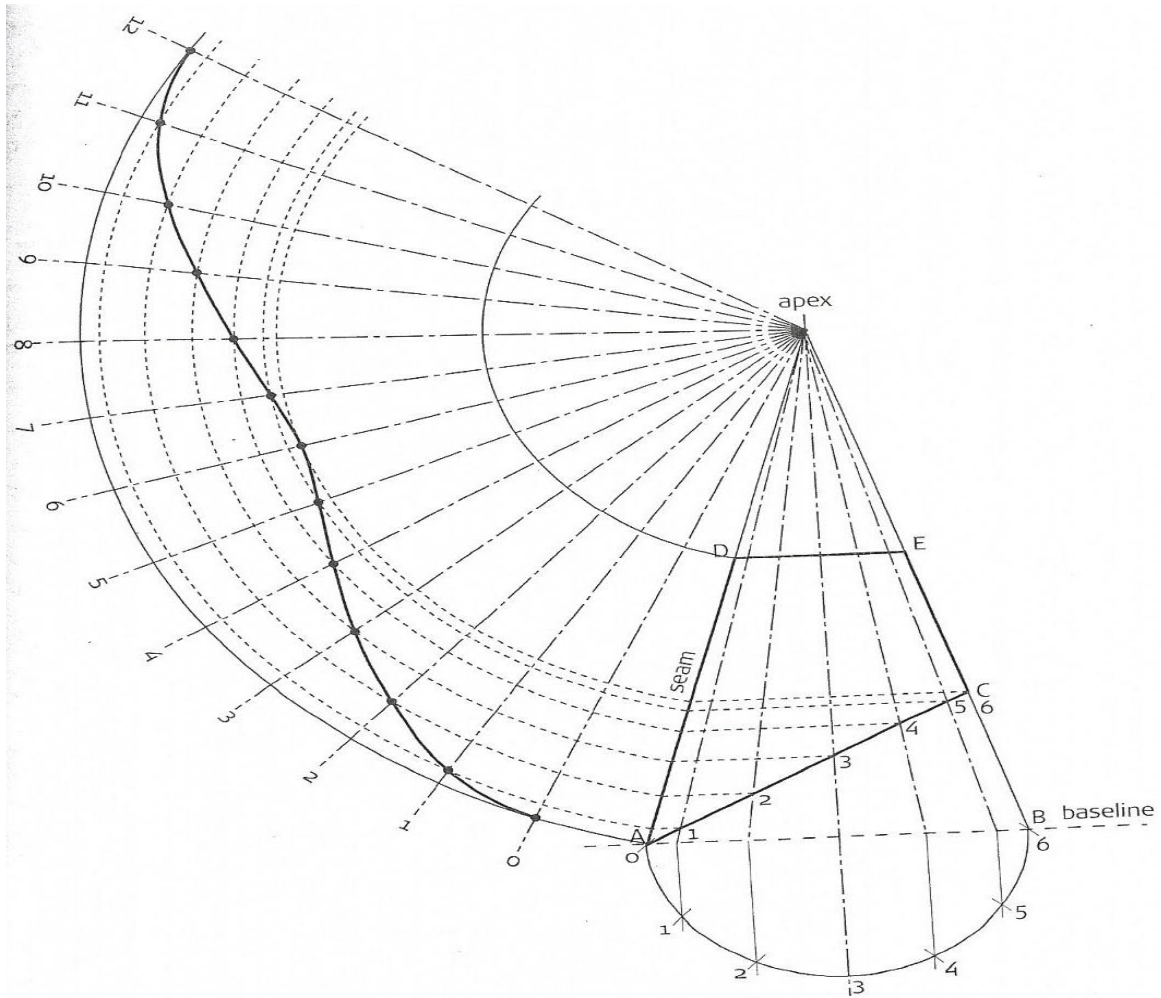
(4 × 1) (4)
- 7.5 One pipe system where all the soil water fixtures✓ and waste-water fixtures discharge into a single stack connected directly to drain.✓

Two pipe system all waste fixtures discharge separately into an open waste stack that discharge into a gully✓ and all soil fixtures discharge directly into drain.✓

(2 × 2) (4)
- 7.6
 - Be self-cleaning
 - Have an adequate water seal
 - Be of uniform bore
 - Not corrode
 - Be of same diameter as waste pipe
 - Simple in design and free of angles

(Any 4 × 1) (4)
[20]

QUESTION 8: SHEET METAL WORK



Distribution of marks:

Elevation	2
Scale	1
Pattern	7
Neatness	2
TOTAL MARKS:	12

[12]

QUESTION 9: CALCULATIONS

- 9.1 Fall of pipe = Length × Fall ratio✓
 = 12 m × 1/28✓
 = 0,429 m✓
 = 429 mm✓ (4)
- 9.2 Invert Depth of pipe = 429✓ + 385✓
 = 814 mm✓ (3)
- [7]**

TOTAL: 100