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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE

## PLUMBING THEORY N1

**3 August 2021**

**This marking guideline consists of 6 pages.**

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## QUESTION 1: SAFETY AND HOUSEKEEPING

1.1 The digging of ground to form trenches, holes and pits below ground level. (2)

1.2
- Do not use two short ladders tied together.
- Always use ladders long enough for the job.
- Never use a board to form a working platform resting on a rung of a ladder.
- Stakes should be driven into the ground and the ladder lashed to those stakes.
- The top of the ladder should be lashed to scaffolding.
- The slope of a ladder should be in the ratio of 1:4 (approx. 75°).

(Any 3 × 1) (3)
**[5]**

## QUESTION 2: TOOLS AND MACHINES

2.1
- Grinding machine (bench grinder)✓ – grinding metals such as drill bits, chisels, etc.✓
- Angle grinder✓ – used to cut or grind materials using different disc types for different materials.✓
- Threading machine✓ – to cut threads and ream pipes.✓
- Portable drilling machine✓ – for drilling holes in different materials.✓
- Arc-welding machine✓ – used to weld metal together by means of an arc.✓
- Generators✓ – to generate electricity for power tools on the building site where no electricity is available.✓
- Manual metal arc✓ – to weld pieces of metal together by means of flash of light formed by the flow of electricity between two points.✓
- Plate compactor or rammer✓ – used to compact trench beds and excavations.✓
- Emery grinding machine✓ – to grind and sharpen tools.
- Spot-welding machine✓ – joining pieces of metal by welding them on spots.✓

(Any 3 × 2) (6)

2.2
- Scriber
- Dividers
- Metallic tape
- Trammel points
- Centre punch
- Steel rule
- Rule
- Wire gauge
- Prick punch

(Any 4 × 1) (4)
**[10]**



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## QUESTION 3: METALS AND MATERIALS

3.1 The gradual destruction or alteration of a metal or alloy by contact with substance of a metal present in the atmosphere such as oxygen, carbon dioxide, water vapour, sulphur and chlorine atoms.

3.2 The process of coating steel with zinc.

3.3 Metals containing iron (e.g. stainless steel).

3.4 Metals that do not contain iron, are non-magnetic and corrosion resistant (e.g. lead).

(4 × 2) **[8]**

## QUESTION 4: SOLDERING AND WELDING

4.1 Heat the soldering to the correct heat✓ and clean the tip with a file to remove old solder and impurities,✓ press the tip into sal-ammoniac together with common solder,✓ as the solder melts, turn the head of soldering iron a few times and a thin layer forms on the tip.✓ (4)

4.2
- Arc welding: the process of fusing metal together using the flow of electricity between metal and electrode.✓ By a flash of light formed by the flow of electricity between two points.✓
- Gas welding: a process of using an oxyacetylene flame to heat two pieces of metal together to a molten state.✓ At the joint the metals run together or are fused into one piece.✓ (4)

**[8]**

## QUESTION 5: COLD WATER SUPPLY

5.1
- Available in reasonably long lengths.
- They are cheap compared to copper tubing and piping.
- They constitute a solid network, especially above ground.
- The piping and joints are strong. (4)

5.2 5.2.1 The water is often in close contacts with cess pits and as a result the water is often contaminated.

5.2.2 Rivers are liable to pollution from manured fields.

5.2.3 Its purity largely depends upon the distance it has travelled underground.

(3 × 2) (6)

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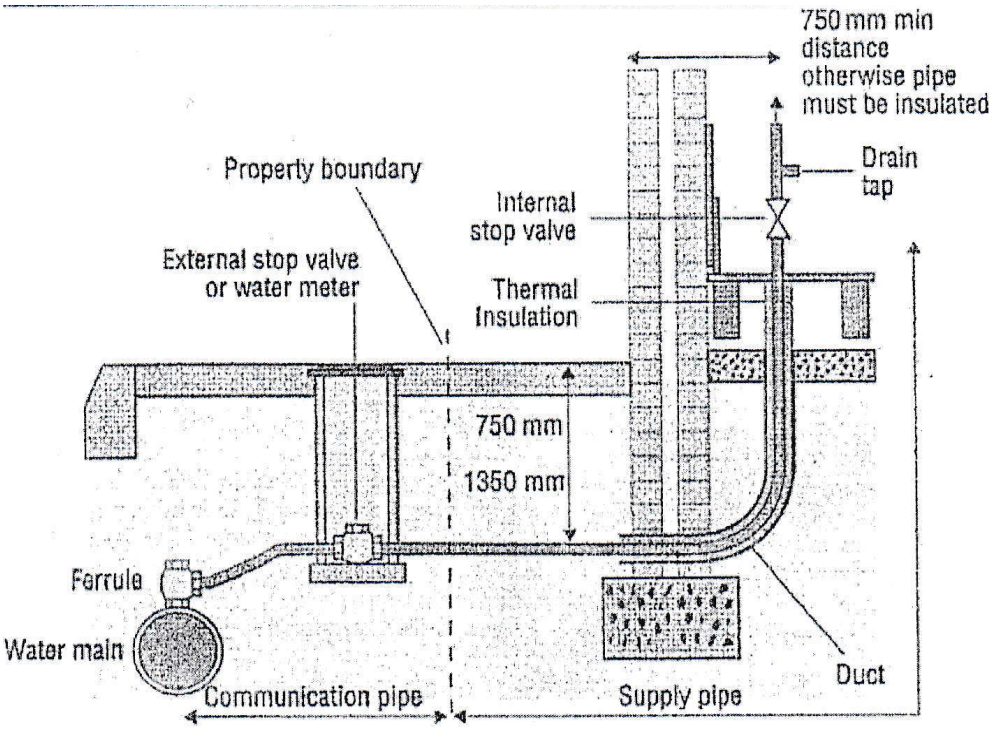
5.3




(Sketch)(3 × 1)
(Labelling)(Any 4 × 1) (7)
**[17]**

## QUESTION 6: HOT WATER SUPPLY

6.1
- Radiation✓ – transfer of heat between bodies that are not in contact.✓
- Conduction✓ – distribution of heat by contact through the layers of a substance with one another.✓
- Convection✓ – distribution of heat by circulation of a liquid or gas.✓ (3 × 2) (6)

6.2
- Air locks are due to air bubbles in the run of piping, blocking the flow of water.
- In hot water lines that have been laid without a gradual rise or fall. (2 × 2) (4)

6.3
- Hot water is available almost immediately.
- It is small and compact and can be installed in small spaces.
- It is simple to install.
- No major pipes or valves are required.
- The expansion pipe and water draw-off pipe are the same pipe.
- No expansion pipes through the roof or eaves are needed. (Any 2 × 1) (2)

**[12]**

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## QUESTION 7: DRAINAGE

7.1 7.1.1
- Ventilation pipe – pipe at the highest point that leads to the open air and provides ventilation throughout drainage installation.
- Ventilation valve – pressure-activated, one-way mechanical vents used in plumbing to eliminate the need for conventional pipe venting and roof penetration. (2 × 2) (4)

7.1.2
- Rodding eye – access opening in a drainage installation to gain full bore access to the interior of the drain for cleaning.
- Inspection eye – any access opening to the interior of any pipe or fitting in a drainage installation. (2 × 2) (4)

7.1.3
- Manhole – chamber deeper than 750 mm and of such dimensions that it allows entry of a person.
- Gully – pipe fitting incorporating a trap into which waste water is discharged. (2 × 2) (4)

7.2
- At a point within 1,5 m of the connection to the point of disposal.
- Within every 25 m on a straight run of the drain.
- At the head of all drains.
- At the head of any branch drain longer than 6 m.
- At a change of direction that exceeds 45 m if a long radius bend is not used.
- On a stub stack in a closed drainage system. (Any 5 × 1) (5)

7.3
- Close-coupled suite
- Low-level suite
- High-level suite (3)

**[20]**



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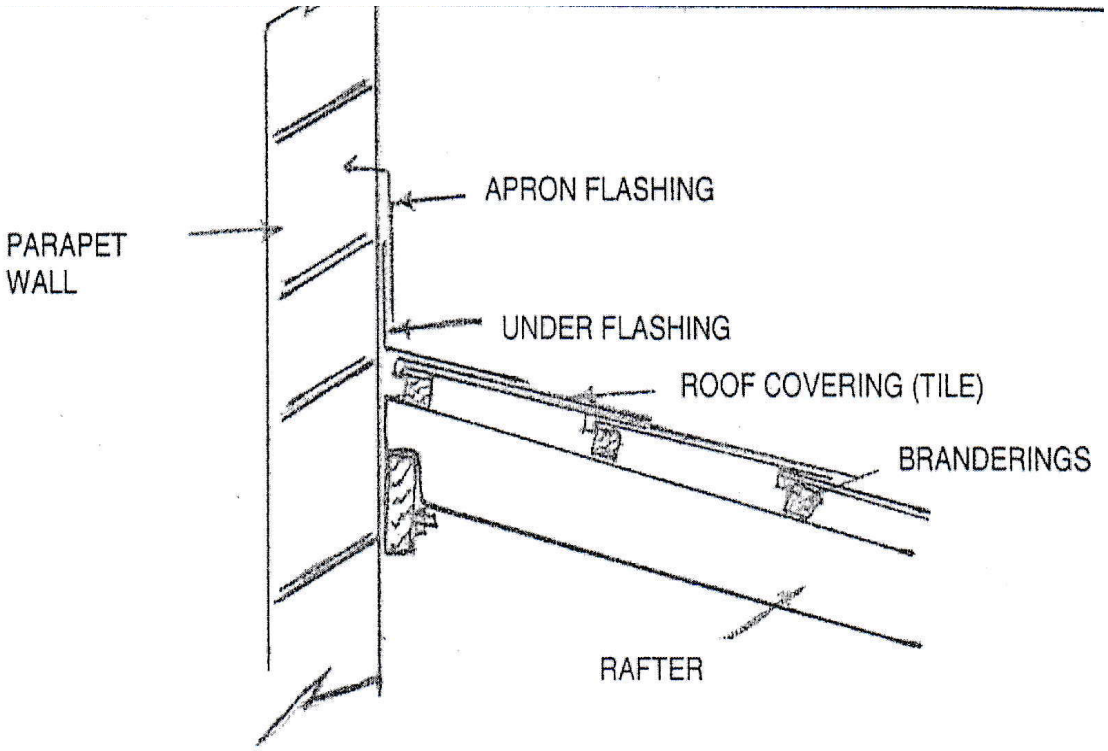
## QUESTION 8: SHEETMETAL WORK




PITCHED ROOF FIXED AGAINST VERTICAL WALL

| | |
|---|---|
| Correctness | 4 |
| Neatness | 2 |
| Labelling | 6 |

**[12]**

## QUESTION 9: CALCULATIONS

Length = 18 m✓
Width = 95 cm ÷ 100 = 0,95 m✓
Height = 20 000 mm ÷ 1000 = 20 m✓

V = L × B × H✓

= 18 × 0,95 × 20✓

= 342 $m^3$✓

Convert answer to litres:

= 342 × 1000✓

= 342 000 litres✓ **[8]**

**TOTAL : 100**

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