higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLUMBING THEORY N1

5 April 2018

This marking guideline consists of 6 pages.

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QUESTION 1: SAFETY AND HOUSEKEEPING

1.1
- Back must be straight and hold chin in.
- Keep arms close to the body.
- Keep feet slightly apart.
- Grip the object with palms of hands and not just with the fingers.
- Bend the knees and lift by straightening the legs. (Any 3 × 1) (3)

1.2
- Their portability in transport and erection
- Their ability to be quickly adjusted to the required height (2)

[5]

QUESTION 2: TOOLS AND MACHINES

2.1
- Test the wheel for cracks.
- Do not overtighten the wheel.
- Do not ream the hole of the wheel.
- Use the correct grinding wheel for the type of metal to be ground.
- Use a paper packing between the wheel and the flange.
- The tool rest should be square with the wheel and approximately 3 mm away from it.
- Replace the wheel when necessary. (Any 5 × 1) (5)

2.2
- Set the tension of the blade correctly.
- Adjustable slide should be tightened.
- It must be hung on the tool board when not in use. (3)

2.3
- To prevent injury to the hands
- To improve control over the file by creating a firm grip (2)

[10]

QUESTION 3: METALS AND MATERIALS

3.1

3.1.1 **Ductility:** The ability of a metal to be extended

3.1.2 **Tenacity:** The ability of a metal to resist from being pulled apart

3.1.3 **Malleability:** Capacity to expand in all directions without cracking when hammered or rolled

3.1.4 **Tenability:** Ability of a metal to resist significant expansion under pressure before it breaks (4 × 1) (4)

3.2
- Dry corrosion generally takes place in high temperatures
- Wet corrosion occurs when there is water present or when the humidity levels exceed about 60% (2)

3.3 Corrosion is the gradual destruction of a metal in an electrochemical reaction✓ with a nonmetal such as oxygen or a chemical reaction with sulphur.✓ (2)
[8]

QUESTION 4: SOLDERING AND WELDING

4.1
- Wiping solder
- Plain solder
- Fine solder
- Best fine solder (4)

4.2
- Neutral flame
- Oxidising flame
- Carbonising flame (Any 1 x 1) (1)

4.3
- **Hard soldering**: It is done with a welding torch which includes oxygen✓ and acetylene and using solder containing copper and zinc.✓
- **Soft soldering**: It is the joining of two pieces of metal✓ with a soldering iron and solder.✓ (2 x 2) (4)
[9]

QUESTION 5: COLD-WATER SUPPLY

5.1
1 Spindle
2 Gland nut
3 Head gear
4 Valve plate
5 Washer/seat (5 × 1) (5)

5.2
- Smell
- Colour
- Taste
- Solubility (Any 3 × 1) (3)

5.3 Potable water is water that is safe to drink. (1)

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5.4 5.4.1
- Two sockets
- Back nut (2)

5.4.2 Pipe threader/hacksaw/Stillson wrench (Any 2 × 1) (2)

5.4.3 Plumber's hamp (1)

5.5
- Lay pipes deep under the ground
- Avoid fixing pipes in exposed positions
- Insulate all pipes and fittings installed on the outside
- Install a drain cock to drain off the pipes at night
- Insulate all pipes and fittings installed in roof spaces and other exposed positions, such as hose taps (Any 4 × 1) (4)

5.6
- They break easily with rough handling.
- The large diameter pipes are difficult to handle.
- They cannot bend to fit into excavations. (3)

[21]

QUESTION 6: HOT-WATER SUPPLY

6.1 Cold water enters the geyser at the bottom.✓ The geyser is heated by means of an element which switches on and off as the required temperature is reached.✓ Hot water outlets are at the top.✓ When hot water is needed, a stopcock on the cold-water feed is opened and the cold water forces the hot water out at the top at the draw-off point.✓ No expansion pipe is needed, as the hot-water draw-off serves as an expansion pipe.✓ No taps/valves may be installed on a hot-water draw-off pipe.✓ (Any 5 × 1) (5)

6.2 6.2.1 CAUSES
- Lime deposits in the pipe restrict the flow of water.
- It can be caused by closing taps quickly.
- It can occur when a mass flow of water is stopped abruptly.
- It can be caused when the tap is situated at the long run of piping. (Any 2 × 1) (2)

6.2.2 REMEDY
- Close taps slowly.
- Rubber washers should not be used on the plunger.
- An air vessel should be installed. (Any 2 × 1) (2)

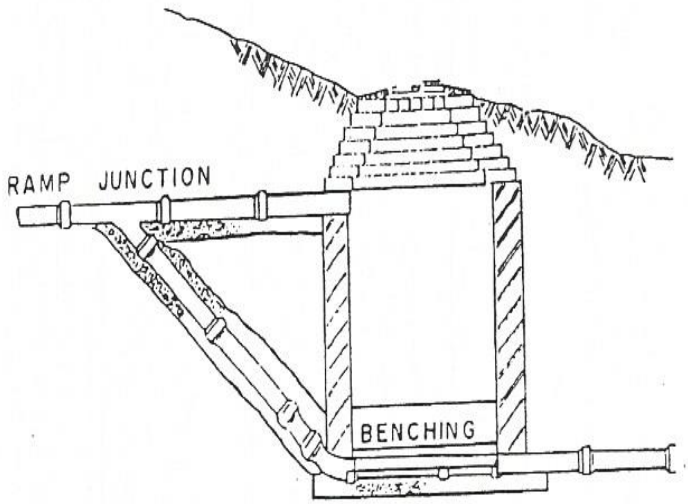
6.3 No,✓ the installed tap will cause the geyser to explode.✓ (2)

6.4 Pressure reducing valve (1)

[12]

QUESTION 7: DRAINAGE

7.1



MANHOLE RAMP

DISTRIBUTION OF MARKS

Overall impression	6
Title	1
Labelling	3

(10)

7.2 7.2.1 **Gully :** A basin in the ground with a water seal to prevent foul odours of the sewer reaching the surface

7.2.2 **Antisiphon pipe :** Keeps the air pressure constant at each trap

7.2.3 **Soil vent pipe :** Ensures a stream of air through the pipework system without polluting the air in the building

7.2.4 **Grease trap:** Should be fitted to take the discharge from the scullery or kitchen sink

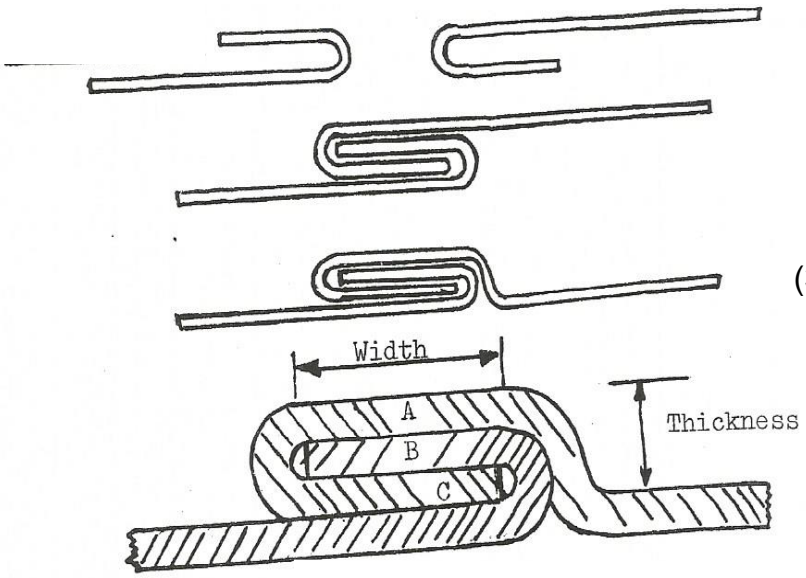
(4 × 1) (4)

7.3 Inspection chamber means a chamber not deeper than 750 mm✓ and of such dimension that access may be obtained to the drain without requiring a person to enter into such a chamber.✓ (2)

[16]

QUESTION 8: SHEET METAL WORK

8.1



(3 marks per step)

GROOVED JOINT (3 x 3) (9)

8.2
- Parallel-line method
- Radial-line method
- Triangulation (3)

[12]

QUESTION 9: CALCULATIONS

9.1 Intensity of pressure = Head of water × 9,81

= 4 × 9,81

= 39,24 kN/square metres/m^2 (3)

9.2 Total pressure = Intensity of pressure × area acted upon✓

= 39,24 × 3,142✓ × 0,025 × 0,025✓

= 0,077 kN/square metres/m^2 (4)

[7]

TOTAL: 100

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