



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**NOVEMBER EXAMINATION 2011**

**PLUMBING  
NQF LEVEL 4**

**18 NOVEMBER 2011**

**This marking guideline consists of 7 pages.**

**QUESTION 1**

- |     |  |       |       |
|-----|--|-------|-------|
| 1.1 | 1.1.1  | False | (1/2) |
|     | 1.1.2  | True  | (1/2) |
|     | 1.1.3  | False | (1/2) |
|     | 1.1.4  | False | (1/2) |
|     | 1.1.5  | False | (1/2) |
|     | 1.1.6  | True  | (1/2) |
| 1.2 | 1.2.1  | 106mm | (1)   |
|     | 1.2.2  | 222mm | (1)   |
|     | 1.2.3  | 73mm  | (1)   |
| 1.3 | <ol style="list-style-type: none"><li>1. Place two masonry units (bricks) of the same size on the foundation.</li><li>2. Place the first straight edge on the two masonry units.</li><li>3. Place the second straight edge on top of the first.</li><li>4. Now place the spirit level on top of the second straight edge and determine which end is the lowest.</li><li>5. Lift the lowest side of the straight edge until the spirit level indicates that it is level.</li><li>6. If the distance between the two straight edges is smaller than 6mm, the foundation is considered to be level.</li></ol> |       | (6)   |

**[12]**

**QUESTION 2**

- 2.1 It is the fixed measurement on the building site to be used as a reference or starting point for measuring all the invert levels of the drain. (2)
- 2.2 The builder, architect or another responsible person. (1)
- 2.3
- A water level.
  - Boning rod and sight rails.
  - A dumpy level with tripod and measuring staff.
  - A spirit level, straight edge, a wooden gradient template and pegs.
  - Profile boards
- Any THREE x 1 mark** (3)
- 2.4 It is an opening in the drainage installation that allows access to the drainage system. (2)
- 2.5 2.5.1 Rise from municipal connection to RE2 =  $\frac{\text{Length of pipe}}{\text{gradient}} \checkmark$   
 $= \frac{16680}{40}$   
 $= 417\text{mm} \checkmark$
- Invert level of RE2 = IL of municipal connection + rise to RE2  $\checkmark$   
 $= 23115 + 417$   
 $= 23532\text{mm} \checkmark$  (4)
- 2.5.2 Invert depth of RE2 = datum level – IL of RE2  $\checkmark$   
 $= 25100 - 23532$   
 $= 1568\text{mm} \checkmark$  (2)
- 2.6 450mm (1)
- 2.7
- Hard ground.
  - Firm ground.
  - Moderately firm ground or dry and loose ground.
  - Loose and wet ground.
- Any TWO x 1 mark** (2)
- 2.8 Call out a professional geotechnical engineer or professional technologist, competent in soil excavations, to decide. (2)
- 2.9
- Clean and sieved building sand.
  - Elected granular material.
  - Concrete bedding.
- Any TWO x 1 mark** (2)
- 2.10 To maintain the water level in the gully. (1)

- |      |              |             |
|------|--------------|-------------|
| 2.11 | • Air test   | (1)         |
|      | • Water test | (1)         |
|      |              | <b>[24]</b> |

**QUESTION 3**

- |      |   |                           |
|------|---|---------------------------|
| 3.1  | To look pretty.   | (1)                       |
| 3.2  | A reaming tool.   | (1)                       |
| 3.3  | 3.3.1 Rod   | (1)                       |
|      | 3.3.2 Washer  | (1)                       |
|      | 3.3.3 Seat  | (1)                       |
| 3.4  | The water freezes inside the pipes.   | (1)                       |
| 3.5  | <ol style="list-style-type: none"> <li>1. Cut out the leaking piece of pipe</li> <li>2. Measure the length of the pipe that you have removed.</li> <li>3. Cut a new piece of pipe 2mm shorter than the piece that you have removed.</li> <li>4. Clean the ends of both the new and old pipes using sandpaper.</li> <li>5. Apply solder flux to the insides of two slip sockets and the outside ends of the old and new pipes.</li> <li>6. Slide the two slip sockets over the new pipe.</li> <li>7. Place it in the open space in the old pipe.</li> <li>8. Slide the slip sockets over the joints.</li> <li>9. Solder the two slip sockets to the pipes and remove excess flux.</li> </ol> | (9)                       |
| 3.6  | To repair a small leak in a GSM pipe.   | (1)                       |
| 3.7  | <ul style="list-style-type: none"> <li>• Using a plunger</li> <li>• Using rods</li> <li>• Using a kinetic ram gun</li> <li>• By coring and scraping.</li> <li>• Chemical cleaning</li> </ul>  |                           |
|      |   | <b>ANY 3 X 1 mark (3)</b> |
| 3.8  | <ul style="list-style-type: none"> <li>• Pipe cutter</li> <li>• Hacksaw</li> <li>• Hacksaw blade.</li> </ul>  | (1)<br>(1)<br>(1)         |
| 3.9  | Because it will perish in the sun.  | (1)                       |
| 3.10 | It prevents leaks.  | (1)                       |
|      |   | <b>[24]</b>               |

**QUESTION 4**

- 4.1 It will cause electrolytic corrosion. (1)
- 4.2 4.2.1 Cover flashing. (1)
- 4.2 4.2.2 Abutment flashing. (1)
- 4.3
- Guillotine. (1)
  - Tin snips. (1)
- 4.4 The angle is the same as the roof pitch. (1)
- 4.5 25mm. (1)
- 4.6 Stainless steel screws. (1)
- 4.7 It will not stick to mortar or plaster. (1)
- 4.8 It is the waterproofing around the chimney that prevents water from seeping in where the sides of the chimney meet the roof. (2)
- 4.9
- Apron flashing. (1)
  - Step (or stepped) flashing. (1)
  - Back gutter (1)
- 4.10 It is a piece of metal used to weatherproof between the wall and the roof covering. (2)
- 4.11
- Lead (1)
  - Zink (1)
- [18]**

**QUESTION 5**

- 5.1 It is the energy given off by the sun in the form of heat and light. (2)
- 5.2 It is the energy or heat that is sent out by the sun in the form of waves. (2)
- 5.3 It is the part of a solar heating system that absorbs the sun's energy and converts it to heat. (3)

- 5.4
1. The sun enters the solar collector box through a glass cover.
  2. The sunlight turns to heat when it reaches the black metal absorber plate.
  3. Insulation keeps the newly created heat from escaping.
  4. Heat builds up and in turn heats up the water in the metal tubes which are part of the collector, and lie on top of the absorber plate.
  5. The hot water then flows or is transported to a storage tank.
  6. An additional traditional heater (geyser), powered by electricity can be used to keep this hot water on temperature. (6)
- 5.5 Because the water flowing into the geyser is hot already and it does not have to heat up cold water. (2)
- 5.6 Because South Africa has a high number of sunny days every year. (1)
- 5.7
- Direct circulation system. (1)
  - Indirect circulation system. (1)
  - Drain back system. (1)
- 5.8 An active solar water heater uses electric pumps to circulate water or other heat transfer fluids through the collectors. (2)
- 5.9 They contain no electrical components. (1)
- 5.10 Because it provides hot water on cloudy days and during periods of increased demands. (2)
- 5.11 It is a heater in which the water is heated at the time of demand. (1)
- 5.12
- Can the roof support the dead load of the solar collectors and the live load of the installation crew?
  - Can the roof work be done safely?
  - Can the collectors be positioned so that they will receive enough radiation to work efficiently?
  - Is there space in the building for the storage tank and associated hardware?
  - Can the plumbing lines be installed between the storage tank and the collectors without having to change too much of the basic building? (3)
- Any THREE x 1 mark**
- 5.13 It is a unit that combines a collector and a storage tank. (2)
- [30]**

**QUESTION 6: BASIC BUSINESS CONCEPTS.**

- 6.1 A business plan. (1)
- 6.2 It is the amount of money a business makes after all the expenses have been paid. (1)

6.3	<ul style="list-style-type: none"><li>• Cash</li><li>• Cheque</li><li>• Credit card</li><li>• Debit card</li><li>• Electronic bank transfer.</li></ul>	<b>Any THREE x 1 mark</b>	(3)
6.4	<ul style="list-style-type: none"><li>• The work that is to be done.</li><li>• The deadline for completion of the work</li><li>• The total cost of the work.</li><li>• When the work must be paid for..</li></ul>		(1) (1) (1) (1)
6.5	<ul style="list-style-type: none"><li>• Listen to the client and try to see his or her point of view.</li><li>• Be calm and do not give your opinion in the heat of the moment without thinking it through first.</li><li>• Stick, where possible, to the motto: the customer is always right.</li><li>• Always refer back to the contract/agreement when complaints arise.</li><li>• If the mistake is yours, admit it, apologise and rectify it at your cost.</li><li>• Always try to keep the door open for future work.</li><li>• If the customer is very unreasonable and unfair, accept your losses and don't go back.</li></ul>	<b>Any THREE x 1 mark</b>	(3)
			<b>[12]</b>
		<b>TOTAL:</b>	<b>120</b>