higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PLUMBING
NQF LEVEL 4

28 November 2023

This marking guideline consists of 5 pages.

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QUESTION 1: BASIC BUILDING WORK AND BUILDING MANHOLES

1.1
- Place a straight edge of 3 m long on two masonry units of the same size.
- Take a second straight edge of the same length and place it on top of the first.
- Place the spirit level on top of the second straight edge and
- Lift one end of the second straight edge until the spirit level shows that is level. (4)

1.2 Raking tool (1)

1.3 A manhole is an inspection chamber✓ deeper than 750 mm ✓and big enough for a person to enter the chamber to reach a drain and his a diameter size of 600mm✓ (3)

1.4 A valve box is a small brick chamber with a cover that gives access to a drain so that debris can be cleared from the drain when necessary.✓✓ (2)
[10]

QUESTION 2: BELOW-GROUND DRAINAGE SYSTEMS

2.1 1:40 (1)

2.2 Because the trench may become an unnecessary safety hazard and collect unwanted debris.✓✓ (2)

2.3 Bedding is the layer of sand or other material that is placed along the bottom of the trench for the drainage pipes to lie on.✓✓ (2)

2.4 A = Benching
B = Channel
C = Brick built chamber
D = Inspection cover (4)

2.5
- SANS 1200LD
- NHBRC
- SANS 10252 – 2 (3 × 1) (3)

2.6 100 mm thick (1)

2.7
- One for pipelines above the water table
- One for pipelines below the water table (2)

2.8 An engineer (1)

2.9 We use the water test for to test for leaks in the drainage system.✓ The test works by filling the section of pipeline you are testing✓ with water and checking✓ for leaks and loss of water in the system over a given period of time.✓ (4)
[20]

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QUESTION 3: PLUMBING MAINTENANCE AND REPAIRS

3.1 The tap, valve or cock will leak (1)

3.2
- Shifting spanner
- Screw driver
- Water pump plier
- Reaming tool (Any 3 x 1) (3)

3.3 A = Pipe
B = Clamp
C = Gasket
D = Bolts (4)

3.4
- Turn off the cold-water main that runs into the geyser.
- Loosen and remove the faulty valve by unscrewing it by hand.
- Buy a new valve with the same rating as the geyser.
- Screw in the new valve by hand taking care that the thread does not get damaged.
- Turn on the cold-water supply to the geyser. (5)

3.5 They will perish in the sun. (1)

3.6
- Remove a section of a pipe around the damaged part by sawing the bad section out of the pipe.
- Prepare the pipe to receive the fitting.
- Apply lubricant to the pipes and fittings.
- Apply the fitting using a gentle force. (Any 4 × 1) (4)

3.7
- A plunger
- Rods
- A kinetic ram gun
- Coring and scraping
- Chemical cleaning (Any 2 × 1) (2)

[20]

QUESTION 4: BOX GUTTERS AND CHIMNEY FLASHING

4.1 Tin snip (1)

4.2 A box gutter is a rectangular gutter that is positioned inside or against a wall and does not hang over the edge of the roof.✓✓ (2)

4.3 The angle that is the same as that of the room. (1)

4.4
- Apron flashing
- Step flashing
- A back gutter (3)

4.5 Pitch is the angle at which a roof slopes or the sloping part of a roof.✓✓ (2)

4.6
- Measure the chimney and its surroundings carefully.
- Draw the outlines and fold the lines on a large piece of paper.
- Draw the step flashing.
- Cut out the apron flashing and the back gutter. Bend them on the fold lines until the angles are correct.
- Cut and fold the step flashing.
- Fit the flashing to the chimney wall. (6)

[15]

QUESTION 5: INSTALLING A SOLAR WATER HEATER

5.1 There would be no life. (1)

5.2 Solar energy is the energy given off by the sun in the form of heat and light.✓✓ (2)

5.3
- The solar heating system must be in a sunny location so that the collector receives enough hours' sunlight every day.
- The sun should shine on the collector between 09h00 and 15h00. (2)

5.4
- Flat plate collectors
- Evacuated solar cubes
- Batch collectors (3)

5.5 Because the outdoor pipes could freeze in severe, cold water. (1)

5.6
5.6.1 True
5.6.2 False
5.6.3 True
5.6.4 False
5.6.5 True

(5 × 1) (5)

5.7 Standby heat loss refers to the heat energy wasted by keeping the water in the storage tank hot while there is no demand for it.✓✓ (2)

5.8 The position of the collector relative to the movement of the sun. (1)

5.9
- Can the roof support the dead load of the solar collector and the live load of the installation crew of two or three men?
- 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. (5)

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5.10
- Place the solar storage cylinder near the conventional water heater.
- If the heat exchanger is internal to the storage tank, ensure that the glycol loop or oil connections to the heat exchanger, as well as cold and hot water connections are accessible.
- Install unions at the storage cylinder and heat exchanger connections so that the piping will not need to be cut if the tank or heat exchanger ever needs to be replaced. (3)

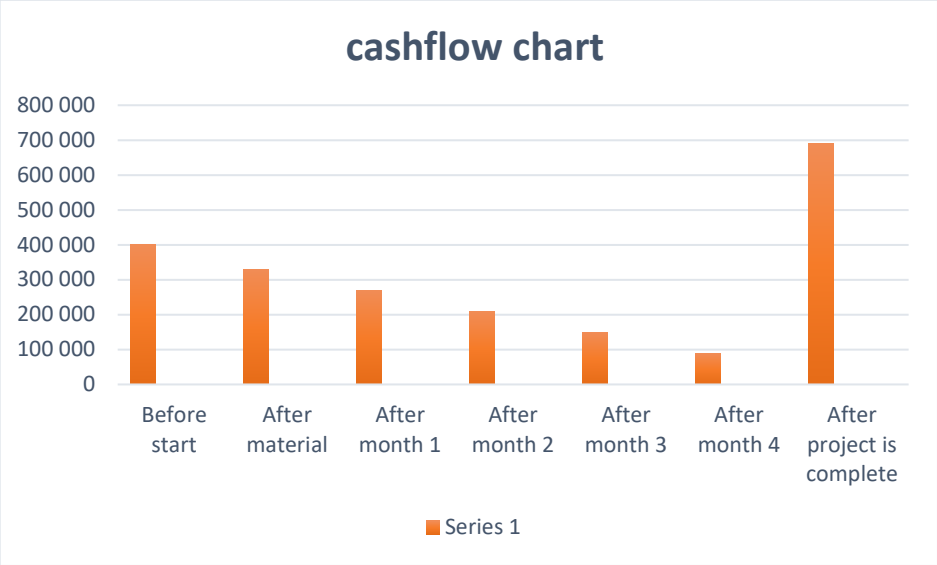
[25]

QUESTION 6: BASIC BUSINESS CONCEPTS

6.1 In order to determine whether the business is viable. (1)

6.2 A business plan is a document that explains what a company wants to do in the future and how it plans to do it.✓✓ (2)

6.3



- Before starting: 400 000
- After material: 330 000
- After month 1: 270 000
- After month 2: 210 000
- After month 3: 150 000
- After month 4: 90 000
- After the project is complete: 690 000 (7)

[10]

TOTAL: 100

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