



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

**ROADS
NQF LEVEL 4**

04 March 2024

This marking guideline consists of 5 pages.

QUESTION 1

- | | | | | |
|-----|--|--|---------|-----------------|
| 1.1 | 1.1.1 | C | | |
| | 1.1.2 | E | | |
| | 1.1.3 | A | | |
| | 1.1.4 | B | | |
| | 1.1.5 | D | | |
| | | | (5 × 1) | (5) |
| 1.2 | This type of drain collects storm water run-off from the road and runs parallel to✓
or along the length of the road.✓ | | | (2) |
| 1.3 | <ul style="list-style-type: none"> • The function of the bridge • Where it will be constructed • Material used to build the bridge • Financial cost of the bridge • Physical obstacles it must cross over • Distance from one side to the other | | | (Any 4 × 1) (4) |
| 1.4 | <ul style="list-style-type: none"> • Earth anchor wall • Gravity wall • Channel lining • Slope protection • Rockfall netting • Erosion protection • Culvert head walls • Wing walls • Bridge abutments | | | (Any 5 × 1) (5) |
| 1.5 | <ul style="list-style-type: none"> • To remove water from adjacent areas of the road. • To allow water down from the gravel shoulder into trenches and pipes. • To direct water away from the underlying road layers. • To remove water from the subgrade. • To remove water from the sub-base. • To remove water from the base. • To remove the prism of the road. | | | (Any 4 × 1) (4) |
| 1.6 | 1.6.1 | <ul style="list-style-type: none"> • To provide access into the drain. • To allow for regular checkups and maintenance. • To allow for clearing blockages | | (3) |
| | 1.6.2 | <ul style="list-style-type: none"> • Bricks and mortar • Pre-fabricated concrete | | (2) |

- 1.7
- Pipes should be laid with a consistent gradient.
 - Pipes should be laid in reverse order.
 - Pipes must be laid with the slots at the bottom of the pipe.
 - Place geofabric blanket/material around the pipe.
 - Place filler or backfill material carefully around the pipe.
 - Do not deform or damage the pipe.
- (Any 5 × 1) (5)
[30]

QUESTION 2

- 2.1 2.1.1 Setting up the side form.
- The side form must rest flat along its length on the surface area.
 - Side form must be made from steel.
 - Use steel anchoring pins to secure the side form on surface.
 - At least three anchoring pins for every 3 metres.
 - Side forms should be secured on both sides.
 - After securing the side forms, check alignment both horizontally and vertically.
 - Check that the distance between the side forms is even.
- (Any 3 × 1) (3)
- 2.1.2 Level the surface area.
- It is important that the surface underneath is level.
 - Remove any unwanted debris from the surface.
 - Compact adequately so that the side form can rest flat along its length without any obstruction
- (Any 2 × 1) (2)
- 2.2
- Subbase
 - Bedding sand
 - Concrete block paving
- (3)
- 2.3
- Non-plastic material.
 - A compacted thickness of not less than 10 mm and not more than 50 mm.
 - Maintained at a moisture content between 4% and 8%.
 - Should not be pre-compacted.
 - Free from any materials that can damage the blocks.
 - Evenly laid.
- (Any 3 × 1) (3)
- 2.4 Compressive strength.
The stress✓a given material can withstand✓when compressed.✓
- (3)

- 2.5
- Spread out dry bedding sand evenly onto the compacted paving blocks.
 - Use a hard broom to sweep the bedding sand between the joints.
 - Hose the grouting sand with a light application of water over the blocks.
 - Sweep the sand in such a way that it fills the gaps between the blocks.
 - Vibrate the bedding sand with a plate compactor into the joints.
 - Sweep between the joints until they are completely filled up.
 - Sweep and remove access bedding sand from the blocks. (Any 4 × 1) (4)
- 2.6
- Fire and explosion hazards
 - Health hazards – skin and eye contact, inhalation of fumes and vapours. (2)
- 2.7
- 2.7.1
- A low flash point is highly flammable.
 - The minimum/lowest temperature, ✓ at which a solvent will produce enough vapour ✓
 - to ignite when in contact with oxygen. (Any 3 × 1) (3)
- 2.7.2
- Rapid-curing asphalt (1)
- 2.8
- 2.8.1
- Bitumen with a very strong adhesive binds with a variety of materials,
 - without affecting the materials' priorities. (2)
- 2.8.2
- Bitumen can be spread relatively easily when heated.
 - Where required it can be liquefied. (2)
- 2.9
- 2.9.1
- Seals are made of a combination of aggregate and bitumen binder. (2)
- 2.9.2
- Single seal
 - Double seal
 - Slurry seal
 - Cape seal (4)
- 2.10
- It is highly flammable.
 - It is potentially explosive.
 - It can cause pollution.
 - It becomes slightly soluble in time and then poses a threat to the surface and groundwater. (Any 2 × 1) (2)
- 2.11
- Penetration test
 - Viscosity test
 - Flash-point test
 - Ductility test
 - Solubility test
 - Softening-point test (Any 4 × 1) (4)

[40]

QUESTION 3

- 3.1
- Frost heaves
 - Thermal cracking
 - Oxidation
- (3)
- 3.2
- Lane closure
 - Temporary diversion
- (2)
- 3.3 It refers to the safety and maintenance works ✓ implemented during ✓ and after the construction of a road. ✓ (Any 2 × 1) (2)
- 3.4
- As an addition to an existing road surface.
 - As additional aggregate in cold-mix-asphalt.
 - If crushed, for an additional base course.
 - As a fill.
- (Any 3 × 1) (3)
- 3.5
- 3.5.1 Asphalt overlays
- Asphalt overlays produce a new more durable road surface ✓
 - Produce a better skid resistant driving surface.
 - Upgrade to an existing surface.
- (Any 2 × 1) (2)
- 3.5.2 Asphalt recycling
- The removing of the old road surfacing material
 - Then re-use of old surfacing material, crushing it and grading it to aggregate for a new surface.
 - Good solution to avoid throwing away removed surfacing material.
- (Any 2 × 1) (2)
- 3.6
- PCC overlay
 - HMA overlay
 - Dowel-bar retrofit
 - Rubblisation
- (Any 3 × 1) (3)
- 3.7
- Crack seals
 - Fog seals
 - Rejuvenators
 - Slurry seals
 - Bituminous surface treatment
 - Patches
- (Any 5 × 1) (5)
- 3.8
- Apply coring to indicate the depth of the cracks.
 - Remove the spalled concrete by chipping.
 - Cut away the concrete with a vertical saw around the spalled area up to the sides.
 - Fill up and compact the concrete as specified.
- (4)

[30]**TOTAL: 100**