higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 2

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This marking guideline consists of 5 pages.

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QUESTION 1

1.1 Large tanker equipped with pump and spray-bar to spray bitumen onto road surface

1.2 Gravel or crushed rocks

1.3 Desired group level where final construction takes place

1.4 Design of amount of soil to be removed during road works to create working surface

1.5 Soil placed in hollow or valley to raise ground level

(5 × 2) **[10]**

QUESTION 2

2.1 2.1.1 To identify area on which will be worked and path road should follow

2.1.2 To find height above or below sea level

2.1.3 To create safe road bend ensuring easy traffic flow

2.1.4 To create precise road construction when setting out angular intersections or curves and bends during road works

2.1.5 To slow down traffic to safe speeds

(5 × 1) (5)

2.2
- Draw line A–B as base, B–C as height and C–A as hypotenuse
- Set out line of reference that will be used as the triangle base, using any value of triangle
- Mark out two points A and B, along the reference line, marking 9,12 et cetera
- Measure out distance of length B–C with measuring tape
- Measure length of hypotenuse C-A (5)

2.3
- Mark out two points with wooden pegs and connect the pegs with cable.
- Mark out 20 metre intervals along the line with smaller pegs.
- Set up the levelled instrument at a convenient position where all pegs are in clear view with no obstructions such as tree and bushes.
- Place a measuring staff at each point along the cable line and at each interval peg.
- Record the staff readings on a survey sheet. (5)

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2.4
- Centre line
- Offsets
- Point of intersection (3)

2.5 Angle between straight line and curve of other road. Set up a theodolite and engineer level with horizontal circle or protector at point of intersection. (2)
[20]

QUESTION 3

3.1
- Gravel
- Sand
- Salt (3)

3.2 3.2.1
- Used for base layer of road
- Mixed with asphalt as construction fill
- Production of material like pipes and bricks

3.2.2
- Provides bulk, strength and other properties to construction material like asphalt
- Decorative material in landscaping
- Used as subgrade layer

(2 × 3) (6)

3.3 Reduces soil strength and stability (1)

3.4 Optimum moisture content is the water content at which soil can be compacted to maximum dry unit weight by a given compactive effort while moisture content is the quality of water contained in the material. (4)

3.5 Moisture content = mass of water/mass of dry soil × 100
= 4,9% (5)

3.6 Stage at which soil begins to behave like liquid owing to the increased amount of moisture it contains. (1)
[20]

QUESTION 4

4.1
- Basic cost of construction, incorporating use of local materials wherever possible and of labour intensive methods where appropriate
- Useful life and cost of replacement or extension
- Effect on travel resulting from delays or extra travel distance due to road closures
- Cost of repairs resulting from damage due t overtopping of road
- Cost of drainage infrastructure maintenance (5)

4.2
- Causes accidents on slippery road
- Damages road surface
- Road surface washed away and potholes caused (3)

4.3
- Natural water table
- Irrigation canal and dams
- Rain fall infiltration (3)

4.4
- Trench drains
- Herringbone drainage
- Layer drain
- Structural drainage (4)

4.5
4.5.1 Edge of road
4.5.2 Edge cut
4.5.3 Edge of road
4.5.4 Area of soil stability
4.5.5 Edge of road where velocity of water is high

(5 × 1) (5)

[20]

QUESTION 5

5.1
- Keep site tidy with no rubbish.
- Provide hand rails for stairs and gangways over trenches.
- Fence all openings in floors, holes in ground and similar hazards.
- Provide good lighting on stairs, passage and other access routes.
- Use only well-constructed ladders properly secured.
- Check that any safeguard, such as guardrails, hand rails and cover over openings in floors are kept in place. (Any 5 × 1) (5)

5.2
- Excavation dug in unstable soil or soil which has been excavated before
- Excessive vibration of construction equipment
- Too much weight near sides of excavation
- Water collected in excavation
- Changes in weather conditions (5)

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5.3
- Formal safety programme for all new employees
- Periodic refresher training for each worker
- Formal supervising safety training program for all supervisors
- Program of regular site visits by safety personnel to review and control job hazards
- Established procedure for emergency evacuation of injured workers
- Provisions for maintaining safety records and reporting accidents in compliance with OHSA requirements (Any 5 × 1) (5)

5.4
5.4.1 Clearing site
5.4.2 Levelling site
5.4.3 Digging trenches
5.4.4 Compacting soil
5.4.5 Digging trenches
(5 × 1) (5)

5.5
- Compactor should be held securely
- Operator of compactor should be qualified
- Surface to be compacted should be clear of rocks and stones (3)

5.6
- Plate compactor
- Rammer compactor (2)

[25]

QUESTION 6

6.1
- Wearing surface
- Base course
- Subbase
- Subgrade (4)

6.2 Soil added and compacted onto existing ground level. (1)

[5]

TOTAL: 100

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