higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 3

27 November 2023

This marking guideline consists of 5 pages.

Copyright reserved

QUESTION 1

1.1
1.1.1 permeability
1.1.2 scraper
1.1.3 formed bitumen
1.1.4 earthworks
1.1.5 side drain
1.1.6 shoulder
1.1.7 guard rails
1.1.8 manholes
1.1.9 density
1.1.10 speed humps

(10 × 1) (10)

1.2
1.2.1 The reduction of the volume of the material excavated when it is used as fill

1.2.2 When soil increases in volume during excavation as a result of air filling the voids created by excavation

1.2.3 A curve that makes a dip

1.2.4 The cumulative distance along the centre line of the road

1.2.5 Materials mixed with low quantities of cementitious or bituminous stabilisers to improve the quality of the materials

(5 × 2) (10)
[20]

QUESTION 2

2.1
- Non-skid resistance
- Economical
- Flexibility
- High stability
- Durability (5)

2.2
2.2.1 A mixture of inert mineral matter such as aggregate, mineral filler and bituminous binder in used for a road surface

2.2.2 A black solid or viscous/sticky liquid made from crude petroleum by a refining process that softens gradually when heated

2.2.3 A mixture of Portland cement, fine sand aggregate, course stone aggregate and water

(3 × 2) (6)

Copyright reserved

2.3
- Fog spray
- Sand seals
- Hot mix asphalt
- Slurry seal
- Dust palliatives
- Concrete
- Chip and spray
- Cape seal (Any 4 × 1) (4)

[15]

QUESTION 3

3.1
- Clear visible to road user
- Large and clear enough to read
- Positioned a safe distance from carriageway
- Made from non-corrosive materials
- Reflective and visible at night and in poor weather conditions (4)

3.2 3.2.1 Heavy mobile concrete- or water-filled plastic structures used in road building or between dual carriageways to prevent vehicles from crashing into each other leaving the road

3.2.2 Road furniture with ambient illumination to the road user during the night and during poor weather conditions

(2 × 2) (4)

3.3 At an intersection (1)

3.4 To avoid the glare of oncoming vehicles' lights from impending the driver's sight (1)

[10]

QUESTION 4

4.1
- Radius centre
- Beginning of curve
- End of curve
- Length of curve
- Road centre line
- Tangent length
- Point of intersection (Any 5 × 1) (5)

4.2 Sight distance is the distance a driver can see a vehicle approaching✓ or an obstacle in the road ahead,✓ while stopping distance is the distance needed by the driver✓ of a vehicle to see and recognise a dangerous obstacle ahead in a road curve and safely stop the vehicle before reaching the obstacle.✓ (4)

Copyright reserved

4.3 4.3.1 The horizontal route a road follows, which includes straights and curves

4.3.2 The arrangement of gradients and vertical curves that take the road over rises or hills and through dips or valleys

(2 × 2) (4)

4.4
- String method
- Quarter method
- Tangent method
- Offset method (4)

4.5
- Always use the two unknown points at A and B to begin constructing the horizontal curve.
- Draw a line that joins A and B and bisects the chord AB at point D.
- Construct a line vertically from point D to point C. Line CD is the same length as line DB. Point C is known as the point of intersection. (3)

4.6
- Mirror
- Vertical telescope
- Levelling screw
- Optical plummet
- Transit
- Optical micrometer
- Upper-plate clamp (Any 5 × 1) (5)

[25]

QUESTION 5

5.1 5.1.1
- Vibrating roller
- Vibrating screed
- Poker vibrator (Any 2 × 1)

5.1.2
- Dozer
- Scraper
- Front-end loader (Any 2 × 1)

5.1.3
- Rock dumper
- Scraper
- Articulated truck (Any 2 × 1)

5.1.4
- Front-end loader
- Digger loader
- Tractor loader backhoe (Any 2 × 1)

(4 × 2) (8)

5.2
- Quantity to be excavated
- Time
- Hardness of the materials
- Plant available (Any 2 × 1) (2)

5.3
- The quality of the material to be hauled
- The distance the material has to be hauled (2)

5.4 When the soil particles in a type of soil are not too wet or too dry to compact the soil properly (2)

5.5 5.5.1 To test the soil density relative to water

5.5.2 To determine the in situ density of the soil

5.5.3 To test the ability of soil to carry a load

5.5.4 To determine the optimum moisture content at which a soil becomes the densest, which is known as maximum dry density
(4 × 2) (8)

5.6 5.6.1 The water content, expressed as a percentage, where further loss of moisture will not result in any more volume reduction

5.6.2 The water content, expressed as a percentage, where a soil changes from plastic to liquid behaviour

5.6.3 The measure of fine-grained soils, such as silt and clay

5.6.4 The water content, expressed as a percentage, between the solid and semi-solid state
(4 × 2) (8)
[30]

TOTAL: 100

Copyright reserved