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 Wooden droppers/sticks placed vertically on both sides of the road✓ to determine the amount of cut or fill of the road✓

1.2 Material often used from a cut or borrow pit✓ to raise and provide support to the formation level.✓

1.3 A machine that digs and lifts soil✓ from the ground with a large bucket in the front and/or the back.✓

1.4 A large machine fitted with a metal plate✓ to push heaps of soil or rubble.✓ Fitted with a ripper✓ to loosen hard soil/rock.✓ (Any 2 × 1)

1.5 Is a mixture of aggregates, ✓ bitumen,✓ and filler✓ used for constructing and maintaining all kinds of road surfaces.✓ (Any 2 × 1)

(5 × 2) **[10]**

QUESTION 2

2.1
- Right angles
- Gradients
- Levels
- Horizontal curves.
- Vertical curves
- Centrelines
- Chainage (Any 5 × 1) (5)

2.2 2.2.1 Hypotenuse - 5
2.2.2 Adjacent - 4
2.2.3 Opposite - 3 (3)

2.3
- Spirit level
- Line level
- Water level
- Boning rod
- Sight rails (Any 4 × 1) (4)

2.4 Any upward sloping/inclined✓ surface to a horizontal✓ plane. (2)

2.5
- Using a small radius method
- Using a large radius method
- Using successive chords/points of intersection method. (Any ONE) (1)

2.6 The profile of a drainage ditch shows how much soil must be removed✓ or added✓ to lay the drain to a required gradient.✓ (3)

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2.7 Offset is the distance measured perpendicularly (90˚)✓ from a centre line.✓
or
A line that is parallel✓ to a centre line of a road.✓ (Any 2 × 1) (2)
[20]

QUESTION 3

3.1 Soil is a composition of:
• Eroded rock/solid particles
• Degrading materials
• Air
• Water (Any 3 × 1) (3)

3.2
- It reduces the soil strength/bearing capacity
- No stability when wet
- Compaction will not be reached because of its cohesive nature
- Swells when wet
- Shrinks when dry (Any 3 × 1) (3)

3.3
- Strength/bearing capacity
- Grading
- Permeability
- Compaction
- Swelling (Any 4 × 1) (4)

3.4
- It reduces the soil strength/bearing capacity
- No stability when wet
- Correct percentage of moisture content will not be reached
- Compaction will not be possible because of too much water in the soil
- Soil will become saturated (Any 3 × 1) (3)

3.5 3.5.1 Grading:
Placing different types of soils into groups✓ according to their properties✓ and sizes.✓ (Any 2 × 1) (2)

3.5.2 Method/process
Passing✓ different soil samples through✓ a range of different sized sieves✓ (3)

3.6 Swelling is the expansion of particles✓ of certain soils due to an increase in the water content✓ of the soil. (2)
[20]

QUESTION 4

4.1
- Maintain safety for the user
- Ensure durability of the road
- Erosion control (3)

4.2
- Slippery driving conditions
- Reduced tyre grip
- Vehicles skidding, losing control
- Aquaplaning
- Water spray reduces visibility (Any 3 × 1) (3)

4.3 4.3.1 Erosion is the natural process✓ that breaks down✓ and weakens earth or rock.✓ (3)

4.3.2 Road erosion can cause damage to edge breaks,✓ underlying pavement layers✓ and road prism,✓ and can cause material to wash away✓ and cause potholes.✓ (Any 2 × 1) (2)

4.4 4.4.1 Out-sloped *crossfall:*
Water that flows across the slope of a whole surface✓ to one side of the road.✓
(2)

4.4.2 *Camber* of a road
Water that flows from the centre of the road✓ to both sloping sides of the road.✓ (2)

4.5
- Trench drains
- Herringbone drains
- Layer drains
- Slotted agricultural drains
- Sand blankets
- Geofabrics (Any 5 × 1) (5)

[20]

QUESTION 5

5.1
- Loose earth in unsafe excavations collapsing on workers.
- Moving earth-moving plant bumps into unwary workers on site.
- Earth-moving plant or construction vehicles colliding into each other.
- Workers can fall into open excavations.
- Overhanging loose rock may fall on site workers.
- Workers can get burns from solvents used on site.
- Workers' eyes and throats can become irritated from cement.
- Damaged underground electrical cables or gas pipes. (Any 5 × 1) (5)

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5.2 5.2.1 Prevent sides from collapsing
Prevent inflow of loose material
Prevent damage to adjoining property during trench collapse
Protect the workers in the trench from collapsing walls
(Any 3 × 1) (3)

5.2.2 Nature or type of soil
Depth of excavation
Presence of ground water
Building close by
Weather conditions
Duration of construction period (Any 2 × 1) (2)

5.3
- Use safety equipment supplied.
- Do not interfere or abuse safety equipment.
- Do not purposely endanger the health and safety of yourself or others.
- Obey orders issued by superiors.
- Comply with general standing health and safety instructions. (5)

5.4
- Working suits/overalls
- Safety boots
- Reflective vest
- Dust mask
- Gloves
- Hardhat (Any 5 × 1) (5)

5.5
- Make sure that no one is behind or in a blind spot when moving the equipment.
- Make sure that you wear a seatbelt at all times when moving equipment.
- Before working with the equipment, make sure that all overhead obstructions like power lines are identified.
- Make sure that you are aware of the loading limits of the equipment you are using.
- Make sure that training is provided before starting to work with the equipment.
- Make sure that inspection is carried out before working with the equipment.

(Any 5 × 1) (5)
[25]

QUESTION 6

6.1
- Selected layer or subgrade
- Subbase course
- Base course (3)

6.2
- Cement
- Lime
- Foamed bitumen
- Bitumen emulsion (Any 2 × 1) (2)

[5]

TOTAL: 100

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