higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 3

XX February 2020

This marking guideline consists of 5 pages.

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QUESTION 1: FURTHER ROAD-BUILDING TERMINOLOGY

1.1 1.1.1 The prime coat is the layer of low-viscosity✓ bitumen applied to the surface of the base.✓

1.1.2 The tack coat is made by diluted✓ bitumen emulsion that is spread onto the primed surface of the base to make it easier for the primed surface to stick✓ to the new surfacing layer.

1.1.3 Fog spray is a light✓✓ layer of a diluted bitumen-emulsion bind sprayed onto an existing✓ seal for maintenance.

1.1.4 Texture treatment is the process used to restore the uniform texture✓ of a surface.✓

1.1.5 Asphalt is the mixture of aggregate, filler✓ and bitumen.✓

(5 × 2) (10)

1.2
- Reducing step hill on the road
- Reducing soil not suitable on the road
- Levelling the road (3)

1.3
- Water-supply pipes
- Electric cables
- Sewer pipes
- Telephone cables (4)

1.4
- Building gabion walls
- Lining channels
- Anti-erosion structures (3)

[20]

QUESTION 2: INTRODUCTION TO ROAD SURFACE

2.1
- Screening aggregate into fractions
- Controlled batching of aggregates and filler using a mass-measuring system
- Temperature and volume of bitumen being sprayed into the mixing drum
- Temperature of the drum during mixing (4)

2.2
- Binder distributor
- Chip spreader
- Roller
- Drag broom
- Front-end loader
- Rotary broom
- Tipper truck (Any 6 × 1) (6)

2.3
- Made of approved crushed stone
- Correct size
- Correct hardness
- Correct shape
- Correct grading (5)

[15]

QUESTION 3: ROAD FURNITURE

3.1
- Pedestrian crossings
- Road maintenance
- Intersections
- At entrances or existing transport areas
- Along the kerb line of high-density shopping streets (5)

3.2 A road marking is any device or material on the road surface that gives information to motorists and pedestrians. (1)

3.3
- Delineating traffic lines
- Giving information to motorists and pedestrians
- Demarcating and regulating parking (3)

3.4 Direction signs show motorists all the information they can use on the road. (1)

[10]

QUESTION 4: ROAD SURVEY

4.1 4.1.1 A reverse curve is the combination of two simple curves✓ that curve in opposite directions.✓

4.1.2 A spiral curve consists of simple✓ and compound curves.✓

4.1.3 Super elevation is the tilting✓ of a road at slight angles.✓

4.1.4 Centripetal force is necessary to keep an object moving in a curved path.✓✓

4.1.5 Set out means locating✓ the various points at equal or convenient distances along the length✓ of a curve.

(5 × 2) (10)

4.2 4.2.1 PVI
4.2.2 L
4.2.3 PVT
4.2.4 G2
4.2.5 G1

(5 × 1) (5)

4.3
- Place the theodolite over a station.
- Take the theodolite out of the case and attach it to the tripod head.
- Observe the station through the optical plummet.
- Adjust the length of two tripod legs at the same time while keeping the third firmly into the ground.
- Use the plate level to level the instrument exactly.
- When the bubble is off-centre, it has an error equal to half the amount the bubble has moved off-centre.
- Remove the parallax by forcing the cross hairs of the telescope against a light background and focusing the instrument on a distance. (Any 5 × 1) (5)

4.4
- Look through the eyepiece of the telescope at the stadia marks.
- Rotate the eyepiece when first looking through the telescope and bring the reticule into sharp focus.
- Make sure that you see a vertical and horizontal line dividing the field of view.
- Align the telescope on the top of the instrument and gently rotate the telescope by hand.
- Bring the staff into sharp focus by using the side focusing screw.
- Check that the spirit level is in the central portion of the scale before reading the staff.
- Determine the horizontal distance from the level of the staff. (Any 5 × 1) (5)

[25]

QUESTION 5: EARTHWORK

5.1 5.1.1 Compaction
5.1.2 Spreading
5.1.3 Hauling
5.1.4 Excavation
5.1.5 Spreading
5.1.6 Compaction
5.1.7 Hauling
5.1.8 Hauling

(8 × 1) (8)

5.2 Soil compaction is the process in which a stress✓ applied to a soil causes densification✓ as air is displaced from the pores between the soil grains.✓ (3)

5.3
- Increasing load-bearing capacity
- Preventing soil settlement
- Providing stability
- Reducing water seepage, swilling and construction
- Strengthening soil (5)

5.4
- Vibration
- Impact
- Kneading
- Pressure (4)

5.5 Gravel (1)

5.6 When calculating the moisture content of soil (1)

5.7 5.7.1 Determining the dry density of soil or gravel

5.7.2 Calculating the mechanical strength of road base courses and subgrades

5.7.3 Measuring the density of soil in relation to water

5.7.4 Determining the optimum moisture content of a soil sample

(4 × 2) (8)
[30]

TOTAL: 100

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