higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 4

22 November 2024

This marking guideline consists of 6 pages.

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QUESTION 1: ROAD DRAINAGE

1.1 1.1.1 B (1)

1.1.2 C (1)

1.1.3 A (1)

1.1.4 B (1)

1.1.5 A (1)

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1.2
- Carriage way or surface course
- Road shoulder
- Side drains
- Ditches
- Culverts (Any 3 × 1) (3)

1.3

1.3.1 V-shaped drain.
Used in flat environment ✓ where there is enough space √ to incorporate a shallow roadside slope ✓at low cost. (3)

1.3.2 Flat bottom drain.
Used in flat environment ✓cutting or hilly terrain ✓ where space alongside the road is restricted. ✓ (3)

1.3.3 Covered drain
Used in flat urban areas ✓where space is restricted ✓ and can accommodate traffic driving over it ✓ (Any 2 × 1) (2)

1.4

1.4.1 Aquaplaning occurs when a thin layer of water builds up ✓ between the treads of the tyres and the road surface. ✓ (2)

1.4.2 This leads to loss of traction between the tyres and the road surface ✓preventing the vehicle responding to steering, braking or accelerating✓ (2)

1.5
- The function of the bridge
- Where it is to be constructed
- The material used to make it
- The financial cost of the bridge
- The size and span of the bridge. (Any 3 × 1) (3)

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1.6
- Erosion protection
- Create a stable slope
- Earth anchor wall
- Channel lining
- Slope protection
- Bridge abutments and wing walls
- Rockfall netting (Any 3 × 1) (3)

1.7
- Crushed stones
- Riverbed gravel
- Coarse sand
- Coal ash (Any 2 × 1) (2)

1.8 A chamber that serves as inspection of✓ and allows access into a sub-surface drainage for service purposes ✓ (2)
[30]

QUESTUION 2: ROAD PAVEMENTS

2.1

2.1.1 *Surface course*
- friction
- smoothness
- noise control
- drainage
- rut resistance
- shoving resistance (Any 3 × 1) (3)

2.1.2 *Base course*
Durable aggregates ✓not damaged by moisture ✓ or frost ✓can be stabilized ✓ or not stabilized. ✓ (Any 3 × 1) (3)

2.1.3 *Sub-base course*
- Lessens the quantity of fines that protrude from the sub-grade into the pavement structure.
- Improves drainage
- Minimizes frost action damage
- Provides a working platform for construction (Any 3 × 1) (3)

2.2
- Concrete slab / surface course
- Sub base
- Selected sub-grade

OR

- Concrete slab / surface course
- Base course
- Sub-base (Any of the three) (3)

2.3 2.3.1 *Fixed-form pavement*
Both manually operated ✓ and mechanised plants ✓can be used (2)

2.3.2 *Slip-form pavement*
Only a mechanised plant is used (1)

2.4 2.4.1 *Type 5-A*
The bocks allow geometrical interlock ✓ between all vertical or side faces of adjacent blocks. ✓ (2)

2.4.2 *Type 5-B*
The block allow geometrical interlock✓ between some faces of adjacent blocks.✓ (2)

2.4.3 *Type 5-C*
The block allow no geometrical interlock✓ between adjacent blocks.✓ (2)

2.5
- Parking lots
- Taxi terminals
- Shopping centers
- Malls
- Bus terminals
- Office parks
- Service stations
- Inner city squares (Any 4 × 1) (4)

2.6
- Fire burns
- Skin burns
- Respiratory complications / diseases (3)

2.7
- Pen grade bitumen
- Cutback bitumen
- Modified bitumen
- Emulsion bitumen (Any 3 × 1) (3)

2.8
- Gap-graded asphalt
- Open-graded asphalt
- Continuously graded asphalt (3)

2.9
- Paver/distributer
- Chip spreader
- Roller
- Broomer/ brooms (Any 3 × 1) (3)

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2.10
- Economical in its production and application
- Produces a durable road surface in all weather conditions
- Repaired with relative ease
- Easily crushed to be re-used
- Resistant to detergents, fuel and oil spillages
- Resistance to water
- Flexible over wide temperature rangers
- Excellent weathering ability. (Any 3 × 1) (3)

[40]

QUESTION 3: ROAD MAINTENANCE AND REHABILITATION

3.1 3.1.1 *Surfacing failures*
- Consist of the breaking up of the surfacing layer,
- thereby exposing but not affecting under lying layer (2)

3.1.2 *Potholes*
- Surface failures that extend into the base course
- forming holes in the road surfacing (2)

3.2 Combination of
- rutting
- cracking
- displacement of the road surface
- displacement of the base layer (Any 3 × 1) (3)

3.3
- Advanced warning area
- Transition area
- Stabilising area
- Buffer zone
- Work area
- Termination area. (Any 5 × 1) (5)

3.4 Involves
- cleaning
- removal of debris
- clearing of vegetation (3)

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3.5 3.5.1 *Road maintenance*

- To slow down the deterioration of the road
- To preserve or extend the service life of the road. (2)

3.5.2 *Road rehabilitation*

- By adding or replacing some of the existing materials of the road
- Removal of the road and restructuring the original slope and natural drainage patterns
- To prevent erosion
- Re-establish site productivity. (Any 2 × 1) (2)

3.6

- To increase visibility around curves and intersections
- To help provide for drainage along the side drains.
- To control invader plants
- To prevent fire hazards
- To provide visibility in terms of security (Any 4 × 1) (4)

3.7

- The existing flexible pavement must be more than 100mm thick
- There must be no reveling on the existing flexible pavement
- There must be little to no bottom up fatigue cracking in the existing flexible pavement
- Joints must not be in the wheel paths
- Proper PCC curing is critical
- PCC flexible pavement bonding is critical to performance

(Any 4 × 1) (4)

3.8 Remixing will be done when additional aggregate is required ✓ to improve the strength or stability ✓ of the recycled asphalt. ✓ (3)

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TOTAL: 100

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