higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 3

16 November 2022

This marking guideline consists of 5 pages.

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QUESTION 1

1.1
- Gravel
- Sand
- Cement
- Lime
- Salt
- Asphalt (Any 5 × 1) (5)

1.2
- To reduce the level of the road.
- To obtain the required formation level of a road.
- To build roads passing through hills or mountains.
- To use as filling where required.
- To remove soil where it is not needed on the road during construction. (5)

1.3
- Cement
- Lime
- Formed bitumen
- Bitumen emulsion
- Blast-furnace slay
- Puzzolanic (Any 5 × 1) (5)

1.4
- Retaining wall
- Corrosion prevention structures, for instance a sea wall
- Temporary flood wall
- To improve energy dissipation in channels
- For aesthetic purposes
- Dams or information structures (Any 5 × 1) (5)

[20]

QUESTION 2

2.1
- Jointed but unreinforced concrete
- Jointed and reinforced concrete
- Continuously reinforced concrete
- Pre-stressed concrete
- Steel fibre reinforced concrete
- Ultra-thin concrete pavement (Any 5 × 1) (5)

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2.2
- The static mode compresses the asphalt and then in vibration mode to thoroughly compact the asphalt.
- The vibration roller operates behind the paver and is followed by the pneumatic or static smooth drum roller for final finish.
- Asphalt must be compacted as soon as possible because there is a limited temperature range for maximum operation.
- Compaction must start at the at the edge of the road where the paving starts and the roller must move straight towards the paver along the edge of the paver surface next to the shoulder.
- The roller must move slowly across the asphalt towards the middle of the road until 50% overlap has been reached. (5)

2.3 2.3.1 Concrete roads are more durable than asphalt road.

2.3.2 Extreme weather conditions are liable to cause more damage to asphalt roads than concrete roads.

2.3.3 Concrete roads are not damaged by leaking oil like asphalt road.

2.3.4 Concrete roads cost more than asphalt roads.

2.3.5 Concrete roads have a longer life span than asphalt roads.

(5 × 1) (5)
[15]

QUESTION 3

3.1
- The importance of the route.
- The size, importance and economic activity of the destination.
- The tourist importance of a town or city.
- Where the town or city is on the road network.
- Whether an alternative route can be used. (5)

3.2
- Loading areas
- Junctions/crossings
- Office parks
- Absorption
- Shopping centres (Any applicable 5 × 1)

(5)
[10]

QUESTION 4

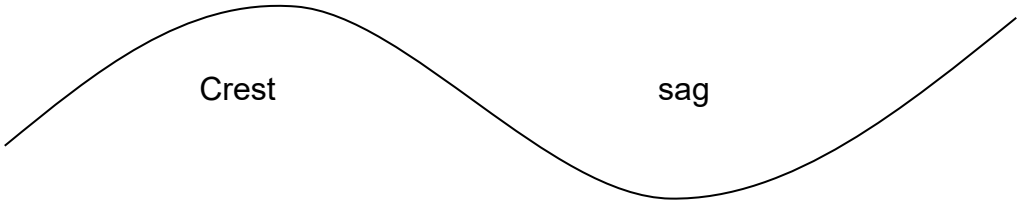
4.1
- Pegs
- Hammer
- Tape measure
- Automatic level
- Chain/Rope
- Picks

(Any 5 × 1) (5)

4.2
4.2.1 Tangent
4.2.2 End of curve
4.2.3 Point of tangent
4.2.4 Middle ordinate
4.2.5 Point of intersection

(5 × 1) (5)

4.3



(4)

4.4
- After using a theodolite, keep it clean and dry.
- Always return the theodolite to the box after having used it.
- Wipe the theodolite with a dump cloth after using it.
- Check all the screws before returning it to the box.
- Two hands should be used to return it to the box.
- The theodolite should be kept in a safe place where it cannot be damaged.

(Any 5 × 2) (5)

4.5 Between minus vertical angle and horizontal direction. (1)

4.6
- Place the tripod over a station and ensure that the tripod legs are firmly placed on the ground.
- Take the theodolite out of the case and attach it to the tripod head.
- Observe the station though the optical plummet and adjust the three-foot screw until the image of both the plummet station are clearly seen together and in focus.
- Adjust the length of two tripod legs at the same time while keeping them firmly on the ground.
- Use the plate level to level the instrument precisely by rotating the theodolite until the plate level axis is parallel to the line through any two-foot screws.

(5)
[25]

QUESTION 5

5.1
- No voids visible in the soil.
- Compacted soil can withstand the load of any object passing over or placing pressure on it.
- It cannot absorb water easily.
- Compacted soil cannot shrink easily.
- Compacted soil particles sticks together and do not allow any objects to pass through. (5)

5.2
- Compactor – to compact soil.
- Grader – to spread the soil across the road.
- Loader – to load material around the site.
- Bulldozer – to remove big rocks and trees from the exposed surface.
- Plate compactor – to compact small sections on the road. (Any 5 × 2) (10)

5.3
- Gabions will sink into the soil as they are heavy.
- Soil will crack and turn to dust because particles are not compacted together.
- During the rainy seasons the soil will become muddy and cause gabion wire to rust.
- It is possible that gabions may by washed away during heavy rain.
- It is possible that plants may grow through gabions from uncompact soil. (5)

5.4
- It can withstand the load passing over it.
- No weeds grow on the soil.
- Water will not penetrate the soil easily.
- Cracks won't develop easily in compacted soil.
- No swelling occurs in compacted soil. (Any 4 × 1) (4)

5.5
- To check whether the is suitable to build on.
- To check soil strength.
- To check whether for clay which is not suitable to build on.
- To check whether the soil particle size is suitable for road layers. (4)

5.6
- Modified AASHTO
- Sand replacement
- California bearing ratio
- Relative density (Any 2 × 1) (2)

[30]

TOTAL: 100

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